Western

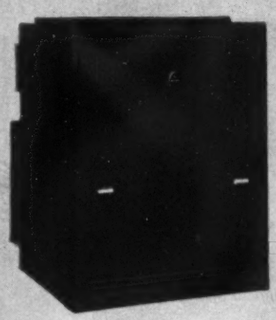
# GAS

FORMERLY WESTERN GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

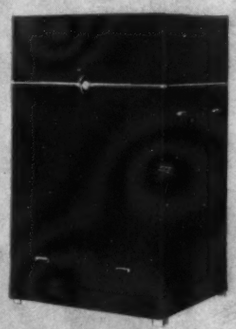
2092

## 8 PLANKS in a Sound Platform FOR THE GAS INDUSTRY



WINTER AIR CONDITIONER

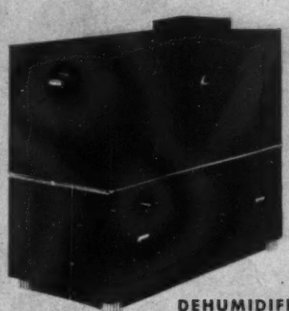
BOILER 255



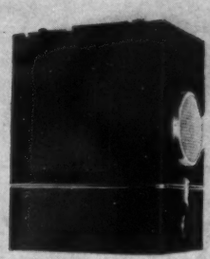
BOILER 455

There's not a weak "plank" in Bryant's "platform" for the Gas Industry. All eight are progressive, promise a greater future and broader use for gas. All are conservative in their fundamentally sound engineering. Their automatic operation and stylish design are keyed to present-day public demand. And they are all popular... have the vote of present users and, through good advertising, are winning new users steadily. This 8-plank Bryant "platform" is one the Gas Industry can profitably support.

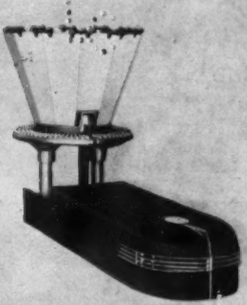
*"Let the pup be your furnace man ... and weather-man, too."*



DEHUMIDIFIER



HUMIDIFIER



CONVERSION BURNER

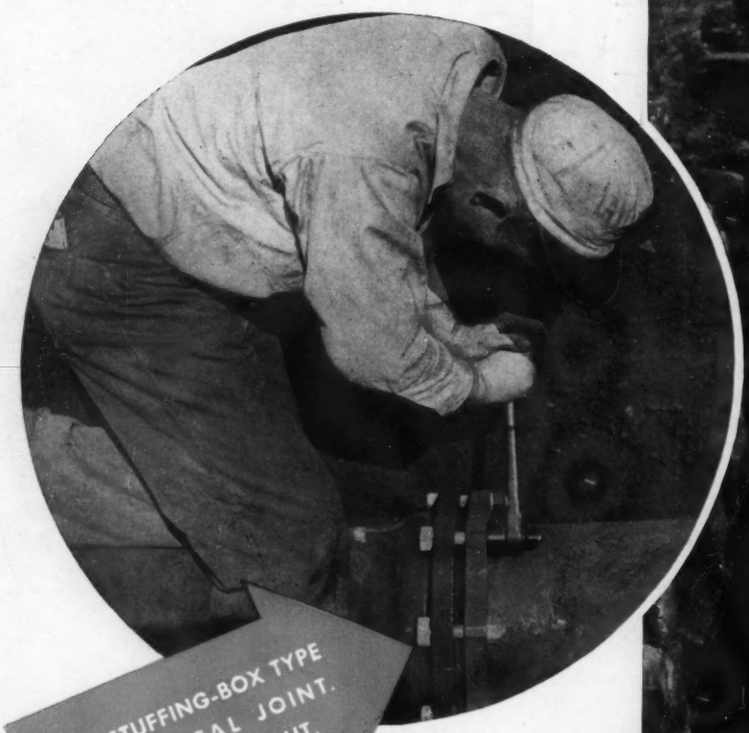
FLUE DAMPER

DUALATOR

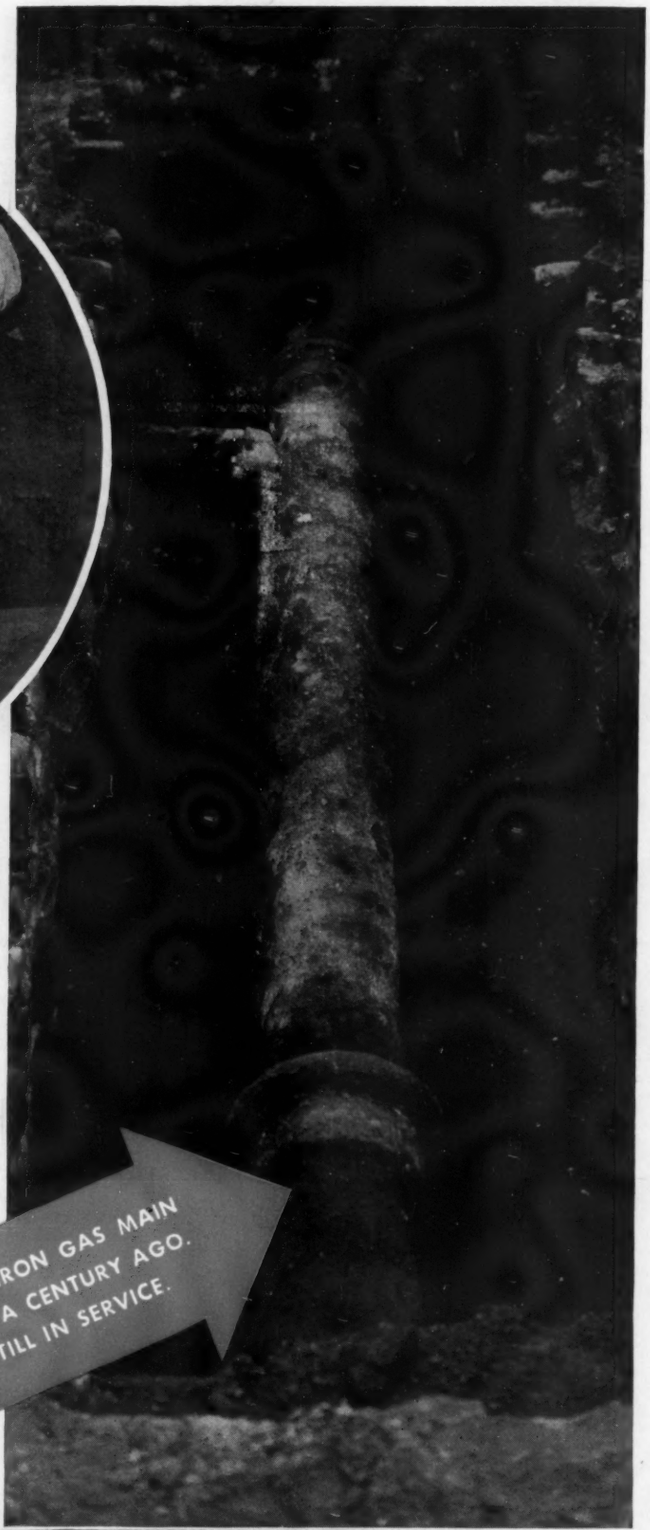
## THE BRYANT HEATER COMPANY

JULY 1936 : : 25 CENTS

TP700
.P3



THE STUFFING-BOX TYPE MECHANICAL JOINT. IT IS BOTTLE-TIGHT.



CAST IRON GAS MAIN LAID A CENTURY AGO. STILL IN SERVICE.

**Modern production methods and metallurgical control, plus bottle-tight* mechanical joints in various designs as produced by C. I. P. R. A. members, make cast iron pipe contribute more than ever to efficient gas distribution.**

•

**Here is shown a cast iron gas main, now in its one-hundredth year of service in Charleston, S. C., about which is written: "it has given excellent service under these trying conditions and of course it is still in service."**

*proved bottle-tight by the A. G. A. laboratory.

# CAST IRON PIPE

**THE STANDARD MATERIAL ☑ FOR DISTRIBUTION MAINS**

**The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, 1013 Peoples Gas Bldg., Chicago**

# PROOF!

## Twice in Ten Years Dresser Couplings Conquer High Static Heads and Mountainous Right-of-Way at Pike's Peak!

More than coincidence is the story of Dresser Coupling performance at Colorado Springs, Colo.

In 1924, this city laid a Dresser-coupled line down the nearby slopes of world-famous Pike's Peak. With a static head of 1100 feet, this 20" line, approximately 2½ miles long, faced unusual service right from the beginning.

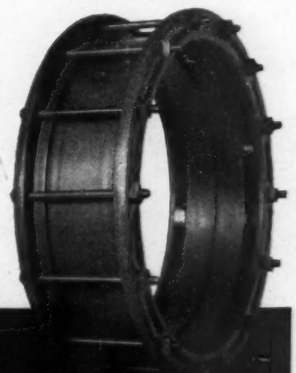
Ten years later (1933-34) Colorado Springs was ready for further extensions to its water system. Again Dresser Couplings were chosen for the joints—and this time the working pressure ran even higher—on some sections as high as 1100 pounds per square inch.

Find out *why* Dresser permanent tightness, flexibility, simplicity, strength, and *true* economy offer the best solution to YOUR pipe-joint problems. Write for descriptive folder No. 355.

**S. R. DRESSER MANUFACTURING COMPANY • BRADFORD, PA.**

*In Canada:* Dresser Manufacturing Company, Limited, 32 Front Street, West, Toronto, Ontario

Note: The two views, above, are also good illustrations of Dresser flexibility for making curves with straight pipe.



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# GAS

**FORMERLY WESTERN GAS**

**Publication Office: 810 South Spring Street, Los Angeles, Calif.—Phone Michigan 1481**
**District Office: 1064 Peoples Gas Building, Chicago—Phone Harrison 8536**

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W. G. RUSSELL, Field Representative


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July, 1936. Volume XII, Number 7. GAS is published monthly by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance), 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the post office at Los Angeles, under the Act of March 3, 1897.


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OFFICIAL PUBLICATION: Pacific Coast Gas Association; Southern California Meter Association.

MEMBER: Audit Bureau of Circulation; Associated Business Papers, Inc.

Barrett

PIPE LINE ENAMELS

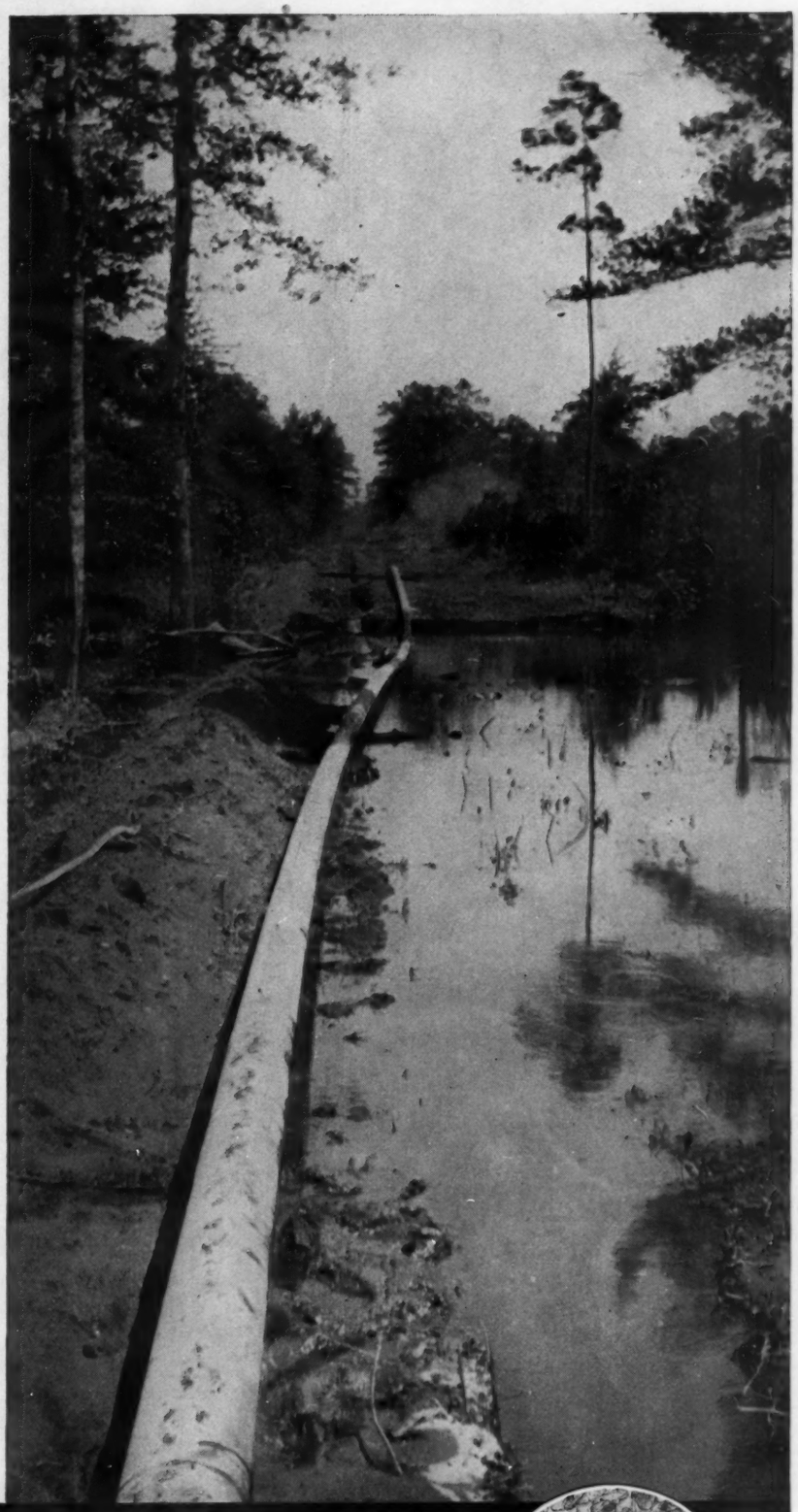
**Maximum Protection at lowest cost per year of service . . .**

To provide effective protection, a pipe line coating must be tough and adhesive, water-resistant, dielectric and impervious to oxidation or deterioration through constant contact with earth acids or by submersion.

Because Barrett Pipe Line Enamels are outstanding on all these vital points, they afford a sound solution to the pipe line engineers' corrosion problems. They provide maximum protection at the lowest cost per year of service.

**THE BARRETT COMPANY**

40 Rector Street, New York, N.Y.



*Courtesy United Gas Public Service Company*

**FIELD SERVICE . . .**

Carefully trained Barrett field men will gladly work with you, combining their special knowledge and experience with your familiarity with conditions along the right of way.

***Reproduction of the micrograph at right shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.***

***For pipe of large diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.***

# *The* STRENGTH *and* DUCTILITY *you need*

## NATIONAL *Seamless* LINE PIPE

FOR making bends in the line, for crossing ravines, rivers, and wherever pipe is subjected to unusual strains, NATIONAL Seamless offers you the greatest reliability you can secure in any pipe.

Pierced from a solid billet of steel, it has no line of weakness to keep a fear lurking in your mind. It is expanded and rolled at temperatures which produce grain refinement and uniform wall strength—every single section thoroughly reliable. And it's ductile, too. No matter what conditions you meet, the combination of strength and ductility will afford a security unsurpassed in any other kinds of pipe.

NATIONAL Seamless is distinctly a modern pipe — adapted to modern needs. Let NATIONAL engineers explain to you the full advantages of seamless for handling oil, gas or gasoline. Send for literature.

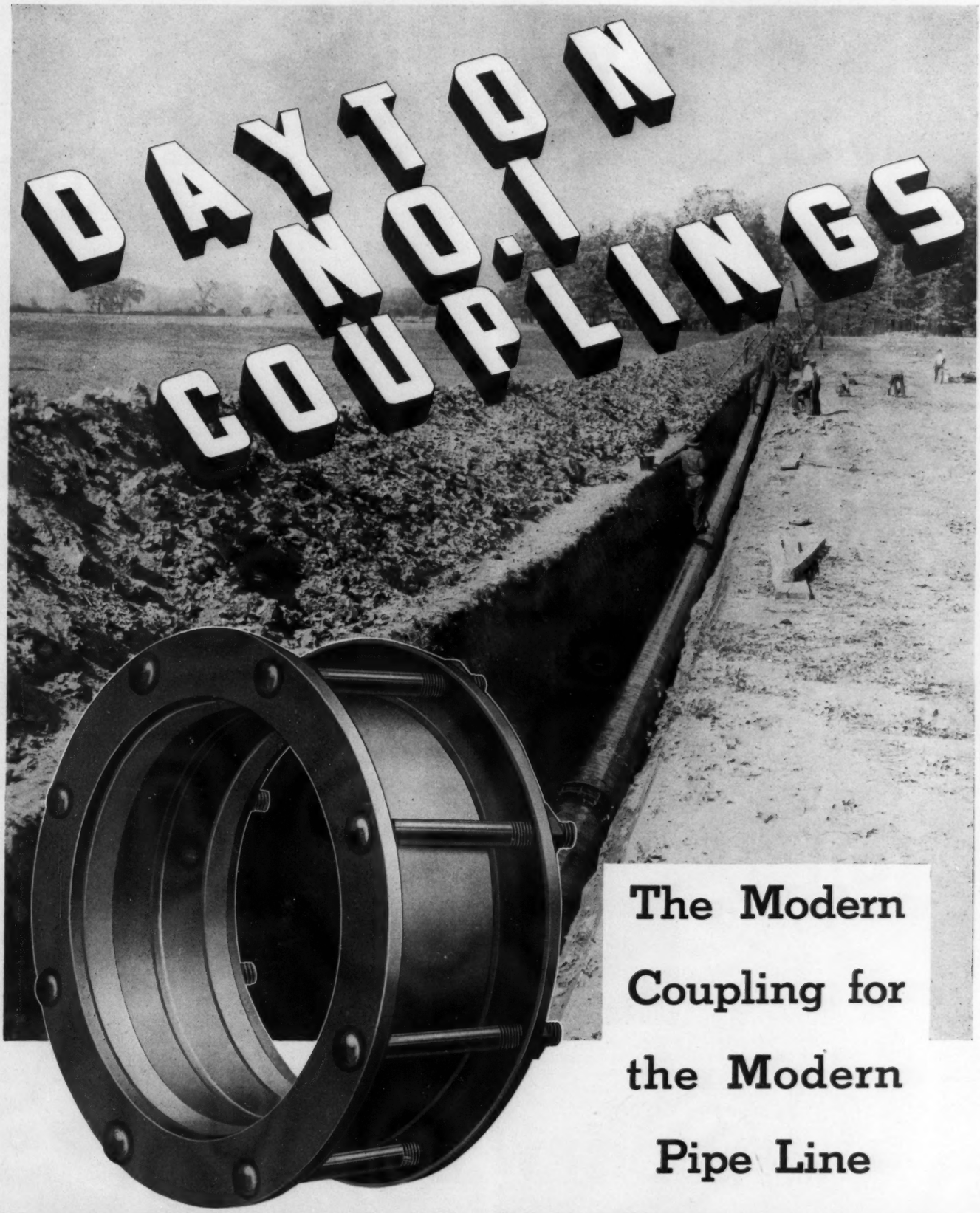
**NATIONAL TUBE COMPANY**

PITTSBURGH, PA.

United States Steel Corporation Subsidiary · *Export Distributors:* United States Steel Products Company, New York City

WALLS WITHOUT WELDS

UNITED STATES STEEL




The Modern Coupling for the Modern Pipe Line

THE NATIONAL SUPERIOR CO.
DAYTON PIPE COUPLING DIVISION DAYTON·OHIO

# SELL A WEDGEWOOD!

## ...you make a friend for GAS

● ONLY WITH GAS can your customer get complete flexibility in cooking methods. With the Wedgewood Gas Range she gets *full benefit* of this flexibility. The reason is that Wedgewood features have been especially designed to make efficient use of the advantages which gas, as a fuel, offers. *Sell a Wedgewood and make another booster for* GAS! A Wedgewood insures maximum food flavor ... minimum food shrinkage, minimum gas consumption and minimum time in meal preparation.

Sales records place Wedgewood in unquestioned leadership in the West. Here is your cue to bigger profits! Women evidently want, and *will have* Wedgewood...the only range with all three essential features by which they can practice every modern cooking method.

**THE NEW AND BETTER WAY TO BROIL**

Wedgewood's *Astogril Broiler* sears both sides of meat at once ...never smokes or permits fats to catch fire.

**TODAY'S TOP-BURNER COOKERY**

...calls for the *controlled boiling* of Wedgewood's *Speed-Plus-Simmer Burners.* These burners permit semi-waterless cooking without special utensils ...save gas.

MODEL 1085, open top—A popular Wedgewood Range equipped with these three outstanding Wedgewood features and twelve other features ... all described in leaflet ready for distribution to your customers. To order same range in closed top style, specify 1045 CT.

**NEW ROASTING METHODS**

...require the two-speed burner in Wedgewood's *Extra-Low-Temperature* Oven. *This oven lights automatically...* burns less gas.

WEDGEWOOD

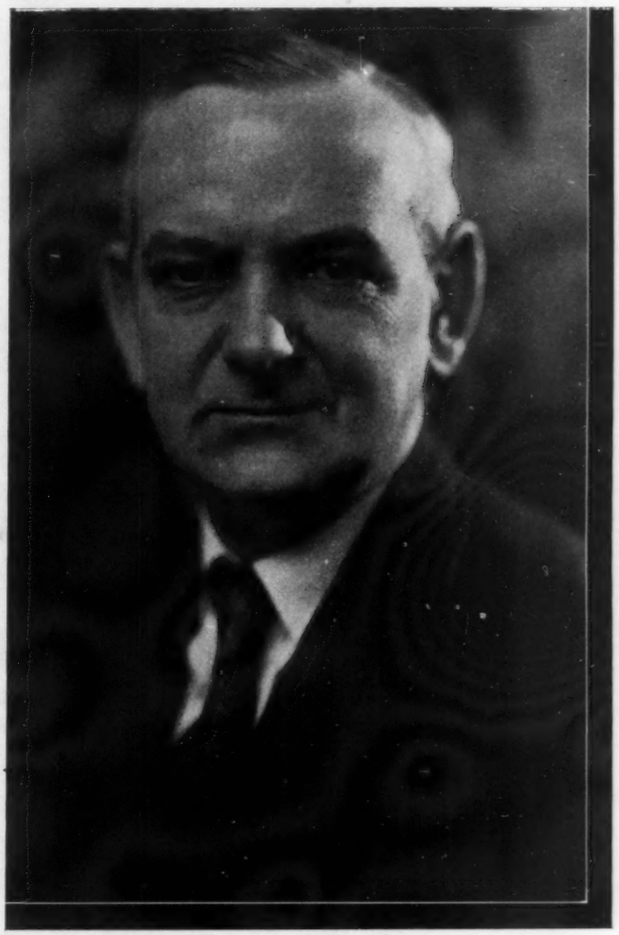
**GAS RANGES • WIN FRIENDS FOR GAS**

*...over a million satisfied users*

**JAMES GRAHAM MANUFACTURING COMPANY • San Francisco • Los Angeles • Newark • Portland**

GAS
July, 1936

# Guest Editorial



## VANCOUVER HO!

By JOHN KEILLOR

President, Canadian Gas Association,
Gas Engineer and Manager, British Columbia Electric Power & Gas Company, Ltd., Vancouver, B. C.

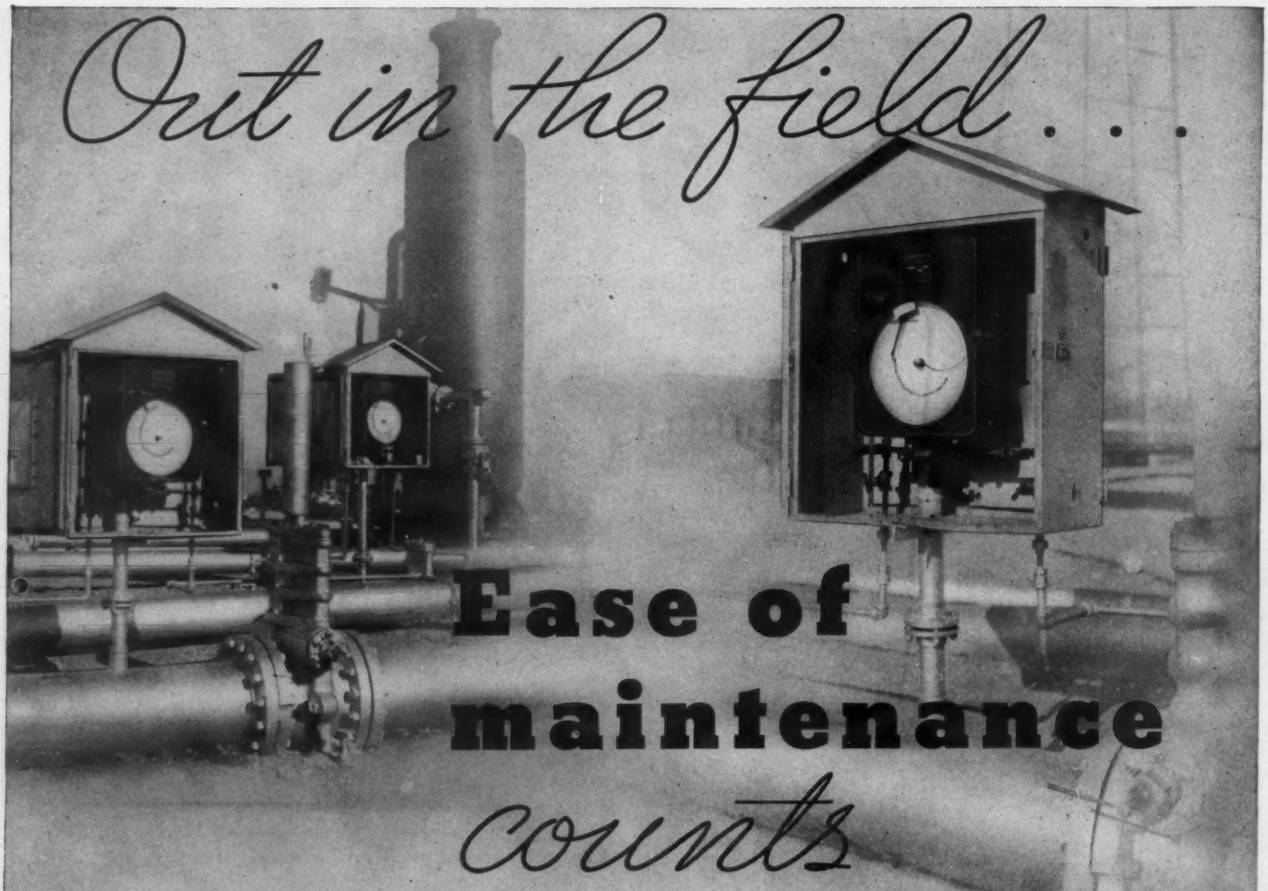
PROGRESS in the gas industry as in every other phase of existence, depends upon building on the experience of others. It is the cumulative knowledge of 125 years of development that has brought the gas industry to where it is today. That experience and knowledge can be utilized largely by gas company executives getting together and comparing notes. Our organizations, such as the American Gas Association, the Pacific Coast Gas Association and one of which I am president, the Canadian Gas Association, have materially advanced the science and art of gas service. The best brains of the continent are continually being applied to problems of the present day and we can profit by such experience by rubbing shoulders with others who are in our line of business.

In the Pacific Northwest, the gas men have made a practice for many years of getting together and in Vancouver we have had the pleasure of being their hosts on several occasions. This year a unique event is taking place in our city when the Canadian Gas Association will meet jointly with the northwest conference of the Pacific Coast Gas Association. For three business days, July 8, 9 and 10, we shall listen to many important addresses on matters pertaining to the gas industry and I can think of no finer education than attendance at this convention.

Incidentally, this is the 50th anniversary of the establishment of the city of Vancouver and also of the incorporation of the Vancouver gas company.

These are days of strenuous competition, not only in the gas industry but in every other industry, and we can hold our ground against the inroads of other forms of heat only by keeping thoroughly up-to-date and applying all possible enthusiasm to the promotion of our business. Locked up in our particular sphere most of the year, we are apt to become too much engrossed in the serious obstacles in our business. It is an excellent tonic to get away once in a while and to find that others have found solutions to our own problems and that others are applying new methods to the promotion of our business, perhaps with outstanding success. Our business system gives us sufficient liberty continually to try out new methods, and the most efficient method wins. Our freedom of thought leads to a variety of experiments, some of which are bound to be successful. Getting together at a convention, such as the one approaching in Vancouver, enables us to trade experiences so that the industry in general may benefit by what one of us has found out. This is the essence of a virile organization just as meeting others energizes the individual and staying at home brings him stagnation.

May I, on behalf of the Canadian Gas Association, extend a most cordial invitation to members of the P. C. G. A. and to gas men from all points in the United States to meet with us in Vancouver in July, and to this I wish to add the invitation of my company, the British Columbia Electric Power & Gas Co., which will be most happy to be your host on that occasion.



*Out in the field . . .*

**Ease of maintenance**

*counts*

Ask the practical field engineer what he thinks of any meter, and he will tell you in terms of how little attention it needs . . . how easy it is to keep in proper adjustment.

That's why you see so many more WESTCOTT orifice meters out in the field where there's no time for coddling instruments.

First, fewer moving parts . . . Second, ease in cleaning without interfering with adjustment . . . these and other specific features designed into WESTCOTT meters give them a ruggedness and a dependability recognized throughout the world.

If you haven't received your copy of Catalog EG-2 giving engineering data, please write us.

AMERICAN METER CO. MEASUREMENT ENGINEERS CENTENNIAL 1836-1936

**AMERICAN METER COMPANY**
INCORPORATED
*Measurement and control of Gas, Oil, Steam, Air and Liquids*
METRIC METAL WORKS • ERIE, PENNSYLVANIA

PACIFIC METER WORKS SAN FRANCISCO

310

July, 1936

# GAS

Vol. XII, No. 7

TWELFTH YEAR OF PUBLICATION

LOS ANGELES—810 South Spring Street . . 1064 Peoples Gas Building—CHICAGO

## Annual Technical Edition

AGAIN next month *G A S* will bring to its readers the Annual Technical Edition which has been an outstanding feature of this publication's editorial service for many years past. In this number are presented papers and reports of the Pacific Coast Gas Association, in advance of that organization's annual convention. This pre-publication plan brings to P.C.G.A. members an opportunity to review the reports before convention discussion, and also brings to readers in other sections an extremely valuable body of technical material. P.C.G.A. committee work and individual paper contributions are accorded high recognition throughout the industry, and this year's material will fully measure up to past standards.

The following partial list of papers and reports to appear in next month's issue will suggest the reference value which attaches to this number:

Clearance pockets for transmission line compressors.

Gas dehydration by calcium chloride.

Current practice and trends in orifice metering.

Application of the Reynolds and Expansion factors in gas measurement.

Resistance of pilot lights to air currents.

Effect of atmospheric humidity in gas calorimetry.

Locating accidental contacts on cathodically protected pipe lines.

Effects of air density on the measurement of specific gravity of gas.

As only a limited printing will be made in addition to the regular subscription list, advance request should be made for extra copies of this issue, and such requests will be handled in the order of their receipt.

## Next Step in Advertising

"UNLESS the local companies go into their local newspapers with programs of their own, the $500,000 is merely a drop in the bucket."

This is the way Chairman T. J. Strickler of the Committee to Conduct National Advertising summarized the case in a recent presentation to the A.G.A. executive board. Much the same idea is conveyed in the words of Henry Obermeyer of the above committee, who in a talk before the New England Gas Association Summer Sales Conference last month posed the question: "Now that you've got it, what are you going to do with it?"

National magazines will be on the newsstands next month with striking gas industry advertising copy. Thus the effort of many years past to put the industry in print takes definite form. But this is no time to sit back with a sense of accomplishment and regard the job as done. The most encouraging element so far in the conduct of the campaign is the determination which the committee shows to get the whole industry wrapped up in the effort.

Since the report offered on this page last month, further progress is to be recorded on campaign procedure. A sub-committee has been appointed to work with advertising agencies in approving copy, consumer booklets, and local promotional matter, its members being the following: F. D. Cadwallader, vice-president, Boston Consolidated Gas Co., chairman; H. M. Brundage, Jr., general sales manager, Washington Gas Light Co., Washington, D. C.; Henry Obermeyer, assistant to vice-president, Consolidated Edison Co. of New York, Inc.; H. W. Olcott, Jr., advertising manager, The Philadelphia Gas Works Co.; Ray T. Ratliff, advertising manager, Kansas City Gas Co.; W. C. Wiegel, advertising manager, Lone Star Gas Co., Dallas, Texas.

Portfolios covering many suggested forms of local support will be issued to the industry about August 1. The aim is to introduce into local advertising of individual gas companies many of the ideas and physical elements from the national campaign.

A perfect example of tie-in with national advertising is seen in the Mystery Chef broadcasts. Those in charge of this extensive radio effort are shaping it to thoroughly dovetail into the national campaign. The Mystery Chef will refer in detail to the text of the magazine advertisements. Thus a potential 8,000,000 radio sets within the territory of the broadcasts will throw attention on the national campaign.

American Gas Association Advertising Bulletin No. 1, issued by the Committee to Conduct National Advertising, was distributed late last month. Every management, sales, and advertising official should see these bulletins, which will keep all participating companies in touch with campaign progress.

It is of utmost importance at this stage for every company to set up its own program for utilizing the national campaign materials in local advertising and publicity. A double-barrelled campaign with local and national phases closely integrated, will give the comparatively small national advertising budget several times its face value, and will react in each locality in direct proportion to the local effort expended.

## Utility Act Nearer Test

IN the District of Columbia Court of Appeals late last month the utilities' case against the Wheeler-Rayburn legislation moved one step closer to definitive litigation. Several months ago Attorney General Cummings secured a stay order to halt injunction suits brought by a number of utility companies against the holding company law. This stay order was reversed on June 22.

The government argued that a multiplicity of suits would tend to break down the machinery of the Department of Justice. It was urged that the hand-picked case brought in by the government against Electric Bond and Share should be given a clear track before other suits were handled. In the June 22 ruling Associate Justice Van Ordsdel held that the other cases pending introduced issues not involved in the E. B. and S. case, and sounded a note highly encouraging to utility sympathizers by stating that "the Government of the United States as a litigant has no greater rights than the humblest citizen."

A speedy decision on all principal issues concerned in the 1935 utility act cannot help but serve the cause of justice, whichever way the decision may swing. No credit reflects upon government representatives for obstructionist methods and special-favor pleading in court.

# HIGH SPOTS FROM THE DETROIT LINE PROJECT

By CRAIG ESPY
Mid-Western Manager, GAS

**THE BRIEF story and accompanying photographs which appear on these two pages merely scratch the surface of a large subject—bringing natural gas to one of America's first-line industrial cities. However, this highlight account is only intended as an introduction. GAS for September will be a souvenir edition devoted to all phases of the Detroit development—pipe line, compressor stations, distribution system changeover, industrial load, and related phases of the project. Our staff representatives have already been over the ground; arrangements are made for an exceedingly interesting and thorough report upon this eventful natural gas extension—EDITOR.**

AS THIS issue of GAS goes to press 2,000 pipeliners are spread across 14 counties in Indiana, Ohio and Michigan, putting the finishing touches to Michigan Gas Transmission Corp.'s 22-inch line to Detroit.

Once before, back in 1888-1901, Detroit was on natural gas, the supply coming from fields near Toledo and from Canada. When the community returns to natural gas after change-over operations beginning around July 1, it will be the largest in the United States on straight natural.

The new supply finds its source in the Texas Panhandle, makes about four-fifths of its 1100-mile journey via the transmission system of Panhandle Eastern Pipeline Co., and the last 270 miles by the lines of the Michigan Gas Transmission Corp., newly created by Columbia Gas & Electric Co. and Panhandle Eastern Pipeline Co. to bridge the gap between Texas fields and Detroit.

Michigan Gas Transmission Corp.'s 230-mile unit now under construction northeast from Zionsville, Ind. joins the Detroit City Gas Co.'s distribution system at Melvindale, Mich. On the south the new construction takes off from the former Indiana Gas Transmission Corp.'s line at Zionsville, about 11 miles north of Indianapolis. Indiana Gas Transmission, Columbia subsidiary, is merged with Michigan Gas Transmission under the new set-up.

Contracts for construction of the line are in the hands of W. S. Bibb Contracting Co. of Dallas, and United Engineers & Constructors of Philadelphia. The Bibb organization has the Southern and Central sections, each approximating 87 miles in length; United Engineers & Constructors has the Northern Section, about 59 miles, including all the work in Michigan.

The main line is being constructed for 600-pound working pressure, pipe being 22-inch OD, 5/16-inch wall seamless steel. Composite construction is used in Indiana and Ohio, two joints electric welded, then coupled. In Michigan the line is almost entirely coupled. Most of the line is enamel-coated.

Wet and soggy ground made the start of construction on the southern end of the line difficult, and much caving ditch has been encountered. Toward the north, sandy soil has been an obstacle, some of this being quicksand. In farmland over the whole course of the line the drainage tile has been a problem, making it necessary to extend the pipe trench to extra depths and replace broken tile.

Seven rivers are crossed—the Mississinewa, Tiffin, Wabash, and St. Mary's in Indiana; the Maume in Ohio; the Huron and Raisin in Michigan. Four 12-inch lines running from headers which are strapped and bolted to concrete piers, cross these rivers. Lines are buried at least 2½ feet below the river beds.

The summary below will serve to give a quick picture of the compressor station facilities, old and new, which will shove Texas gas to Detroit on the Panhandle Eastern-Michigan Gas Transmission system. Starting at the Texas end, the stations run as follows:

Sneed, Texas.....new 2600 h.p. station
Liberal, Kan.....2000 h.p. addition, raising total station capacity to 7000 h.p.
Greensburg, Kan.....new 3900 h.p. station
Haven, Kan.....new 3900 h.p. station
Olpe, Kan.....new 3900 h.p. station

The Fluor Construction Corp., Los Angeles, is constructing the above stations.

Louisburg, Kan.....existing 5000 h.p. station remains unchanged.

Houstonia, Mo.....new 5200 h.p. station
Centralia, Mo.....new 3900 h.p. station
Pleasant Hill, Ill.....new 2600 h.p. station

On the above four stations construction is in charge of Arthur G. McKee Co., Cleveland.

Tuscola, Ill.....station to be constructed next year.
Glenarm, Ill.....existing 4000 h.p. station remains unchanged.
Montezuma, Ind.....new 2600 h.p. station

Lockett & Co., New Orleans, has the contract for the Montezuma station.

Zionsville, Ind.....station to be constructed next year.

The Montezuma and Zionsville locations are on the Michigan Gas Transmission Corp. system, while the other stations are on the Panhandle Eastern line.

Another important item in the new construction is the dehydration unit and natural gasoline absorption plant being added at Liberal, Kan., this contract being in the hands of The Stearns-Roger Manufacturing Co., Denver, with engineering and design by Parkhill-Wade, Inc., Los Angeles.

This plant is designed to handle 135,000 M c.f. daily at 450 lbs. per sq. in., extracting about 0.3 gallons per M c.f. of 26-70 gasoline. Design will permit later increase in capacity to 200,000 M c.f. Dehydration is accomplished by a refrigerated calcium chloride brine system to be described in a later issue.

Michigan Gas Transmission Corp. in April started construction on a metering station, located at the River Rouge plant of the Detroit City Gas Co., and a regulator station which is about 4.7 miles down the line from the meter station. These are fine examples of modern measurement and pressure control facilities.

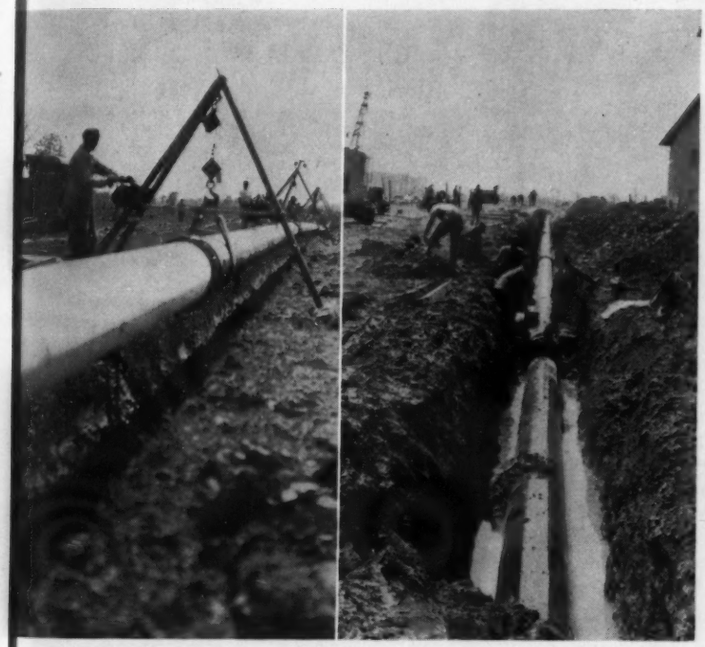
Handling of equipment for all of the line has headquartered at the Ft. Wayne, Ind., office of Michigan Gas Transmission. Because of the speed at which this large project had to go down, perhaps a greater array of large pipeline equipment was concentrated on it than on any previous pipe line undertaking, and labor forces were built up to high peaks.

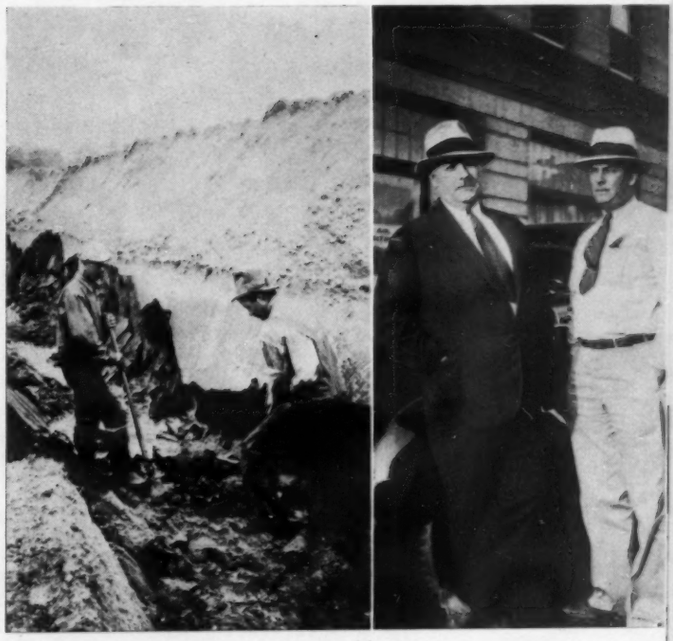
Jack C. Reinbold, as general superintendent of Michigan Gas Transmission Corp.—borrowed from Panhandle Eastern—has had charge of the Detroit extension. L. E. Ingham, coming from the Columbia system, is assistant superintendent and D. K. Stephens of Panhandle Eastern is construction superintendent.

IN CROSSING the Raisin River in Michigan the pipeliners encountered a solid rock river bottom. It was necessary to construct a coffer dam, and dynamite trenches through the rock formation. Here are seen two views of the coffer dam operation.

Lowering in 22-inch line, at a point in eastern Indiana. Note that pipe has been whitewashed to keep paint from slipping on hot days.

In this soggy ditch pipe had to be layed and coupled up one joint at a time. Trucks had to be pulled over part of the right-of-way by tractor.

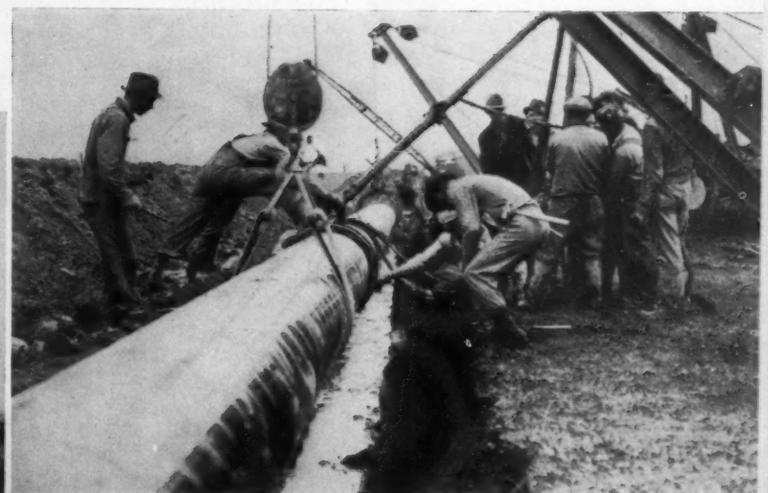


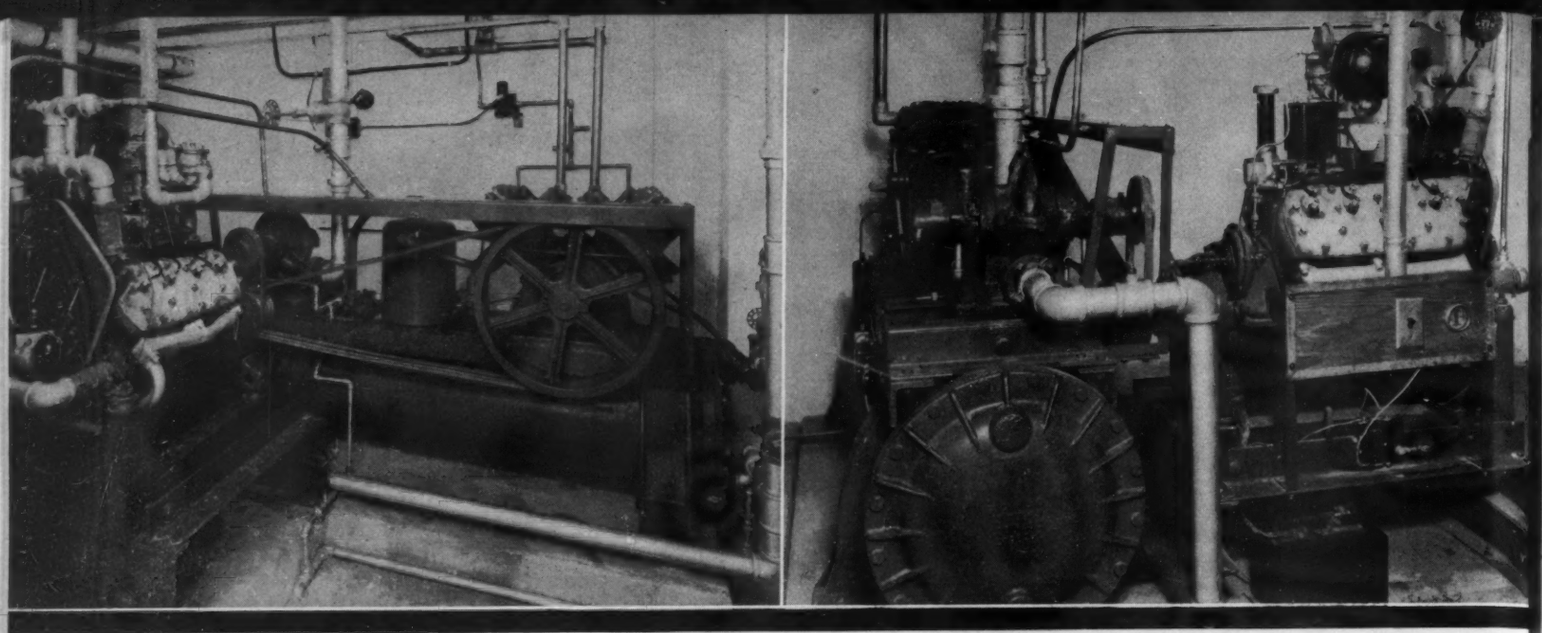


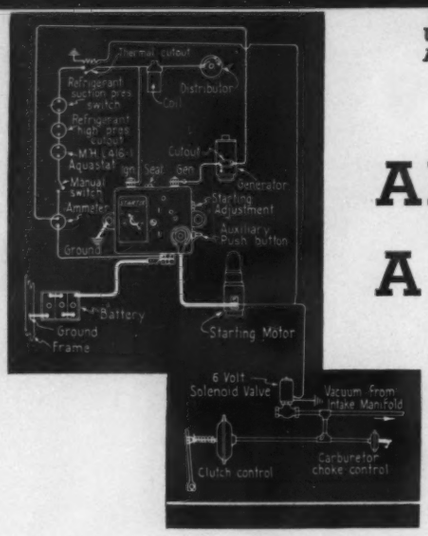
Caving ditch made it necessary to use side cutters on trenching machines, and a good deal of hand labor was called for.

Jack C. Reinbold (left), gener superintendent of Michigan G Transmission Corp., and L. Ingham, ass't superintende

BELOW: Some of the 22-inch pipe arriving at Zionsville, Indiana, where Michigan Gas Transmission Corp.'s new construction takes off from the existing line. AT RIGHT: Couplings being "two-bolted", on southern portion of line.








**UPPER: Two views of Amarillo Gas Co.'s compact air-conditioning installation. INSET: Automatic control system for above Ford V-8 motor, driving 20-ton refrigeration compressor.**

# AIR-CONDITIONING WITH A FORD V-8 GAS ENGINE

AN air-conditioning unit powered by a Ford V-8 engine working on natural gas fuel is now keeping headquarters offices of the Amarillo (Texas) Gas Co. cool and comfortable. Four months of successful operation are already behind the installation, which was made under the direction of Edwin Snook, utilization engineer. Through the courtesy of Waldo M. Wright and Mr. Snook, both of the Amarillo Gas Co., the following facts on this air-conditioning job have been made available.

With most summer air-conditioning systems using compression refrigeration for cooling, through relatively simple and well-proven equipment which is available from numerous manufacturers on a factory production basis, it was obvious to the Amarillo company that this method represented a quick market by substitution of gas engine power for the electric motor units hitherto used. To succeed in this application the engine must be (1) quiet in operation, (2) completely automatic, (3) reliable, and (4) economical. Mr. Snook was convinced that the natural gas engine could qualify in all four particulars, and approval was given to install a gas-powered unit in the gas company building.

The air-conditioning unit used is of the suspended type, using direct expansion surface coils for cooling, steam coils for heating, replaceable dry-type filters for cleaning, spray humidifier, blower, and distributing duct system.

The refrigeration compressor is a Freon four-cylinder V-type, with multiple V-belt drive. It was equipped with a suction pressure switch for stopping and starting, and a high pressure cut-out, both of which are standard equipment for electric motor drive. The compressor is rated at 20 tons capacity and is normally driven by a 20-h.p. electric motor. The electric motor was simply replaced by a Ford V-8 engine and controls were added to provide automatic operation.

The engine was mounted on a structural steel base using standard rubber engine mountings. This mounting, combined with the smoothness built into an 8-cylinder engine, reduced the vibrational noise to a level practically equivalent to that of an electric motor. The exhaust gases were passed through a muffler and then into a brick chimney. With the unit located in the basement, the noise of operation cannot be detected on the first floor.

To obtain automatic operation Mr. Snook selected controls which were easily obtainable on the market, and which had been proved reliable by years of use. The Startix system is a Bendix product and has been used on a number of cars having "switch key starting". The switch key circuit is the basic control circuit and into it are wired the refrigerant suction pressure switch and high pressure cutout switch. An aquastat for engine temperature protection, and thermal cutout for starting motor protection, were also added. An electric solenoid valve in the starting motor circuit controls the operation of the automatic clutch and carburetor choke.

An industrial type clutch, made by the Twin Disc Clutch Co., was used to obtain a convenient power takeoff. It was made to operate automatically by the addition of a diaphragm control fashioned from a gas regulator diaphragm case. An Ensign natural gas carburetor was used because of its easy starting characteristics and its ready response to variable load. The entire assembly, including controls, was purchased at a cost under $350, which compares favorably with the cost of an electric motor and starter.

The installation has been in operation for approximately four months and no difficulties of any kind have been experienced with it. Operating at full load, the fuel cost per hour on the Amarillo Gas Co. domestic rate is approximately 9 cents. This is less than one-fourth the

*(Continued on Page 66)*

● **A severe Michigan winter impeded but did not stop the pipeliners who brought gas to Lansing. The city went on "straight natural" May 25.**

# NATURAL GAS FOR LANSING AND SUBURBAN COMMUNITIES

BACK in 1931 Consumers Power Co. of Jackson, Mich., laid a 42-mile 8-inch natural gas line from the Broomfield, Mich., gas area, near Mt. Pleasant, to connect with its manufactured gas distribution at Midland. This line has since been termed a "feeler", sent by the company into the then unexplored gas business.

A glance at the accompanying pipe line map, which contrasts natural gas lines maintained by Consumers Power with its manufactured gas system, shows how far the company has traveled from its original start, in the last five years.

The latest additions to the fast-growing natural gas system are Lansing and its suburban towns, East Lansing, Grand Ledge, Hastings, Lake Odessa, Iona, Mulikin, Nashville, Portland, Vermontville, Lake Chemung, Charlotte, Woodland, Sunfield, Eaton Rapids, Okemos, Lake Lansing, Mason, Leslie, Holt, Howell, Williamson, Webberville, Brighton, Fowlerville and Haslett.

Gas was made available to the towns through a 62-mile 10-inch line originating in the Central Michigan gas fields. Construction had commenced on the line on December 27, and it reached Lansing on April 15.

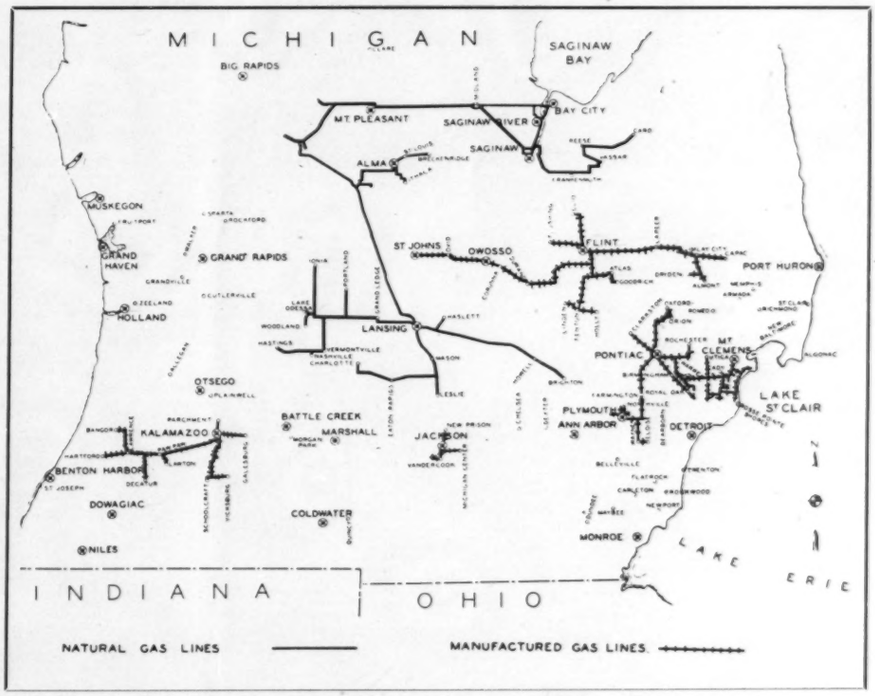
Lansing got mixed gas on May 4, it being the company's policy to introduce mixed gas first, then straight natural. The city went on straight natural May 25. The suburban area got mixed gas June 15 and went on straight natural the end of the month.

Between the beginning point of the natural gas program and the latest changeovers a number of important developments were recorded.

The original line to Midland tapped the Broomfield gas area. In August, 1933 natural gas from the same field went into Bay City and a month later into Saginaw. Previously these towns had been served from a manufactured gas transmission system.

In 1935 the Belvidere field, sometimes called the Tri-Township field, lying south and west of the Broomfield area, was tapped. Twenty miles of 6-inch pipe tied this new field into the system serving Saginaw and Bay City at a point west of Mt. Pleasant.

The Refineries Fuel Supply Co. had built a 4-inch line in 1935, from Ferris Township in Montcalm County to Alma to supply gas to its refinery.




● **Natural and manufactured gas lines on Consumers Power System.**

Consumers Power was serving manufactured gas in Alma and from the Alma plant to St. Louis, Breckenridge and Ithica. A contract was negotiated between the companies with the result that Alma was changed over to natural gas in February, 1936 and the other three towns changed over shortly thereafter.

Another field recently tapped in the interest of the Lansing line is the Crystal area in Sumner and New Haven Townships in Gratiot County. This tap line amounting to 6 miles of 4-inch pipe was completed the middle of April.

*(Continued on Page 62)*

# Domestic Vents and Flues and Boiler Stacks

**THE following material contributed by Mr. Wills to the Pacific Coast Gas Association's last annual convention, refers to and supplements an original study by the same author made in 1932 as a P.C.G.A. project. This original contribution was published in WESTERN GAS for August, 1932, and those who have retained this number in their files will wish to refer to it in connection with the present valuable addition.—EDITOR.**

By FRANK WILLS
Engineer of Production
Pacific Gas and Electric Company

IN 1932 a report (P.C.G.A. Proceedings Vol. 23, 1932) was submitted proposing a certain procedure for calculating sizes of vents and flues for gas burning equipment. Since that time it has become evident that appliances that have received the approval of the American Gas Association Testing Laboratory may vent themselves with vents and flues smaller than required by the formula developed at that time. The present report proposes a revised equation for approved appliances. It is based upon the present requirements which gas appliances must pass before securing approval. The revised formula is therefore submitted for the purpose of correcting misunderstandings that may have arisen from the previous report.

In the development of the previous equation it was assumed that the flue must provide sufficient draft to take care of one velocity head for entrance to the horizontal run and poor flow conditions that might exist there. An additional velocity head was also allowed for the stack gas stream. The average temperature of the stack gases was assumed to be 150° F. and the dilution by air at the draft was taken as 100 per cent. At that time it seemed advisable to be quite conservative because many venting difficulties were encountered. The high resistance and dilution chosen, and the low temperature used were known to contain a considerable allowance for a safety factor.

The A.G.A. Testing Laboratory now requires that appliances shall vent themselves through the draft hood without spillage when 4 feet of vertical flue is attached. It further appears that stack gas temperatures of 200° F. and a dilution of 25 per cent at the draft hood are sufficiently conservative for a basis upon which to establish recommendations for vent and flue sizes for approved appliances.

Since, with gases heated to 200° F. (and room at 60° F.), 4 feet of vertical height of flue is capable of producing a head of 1 foot and since the friction loss is probably 0.2 to 0.5 velocity head depending on the diameter, the net result is the possibility of this section of flue being able to produce a velocity in the neighborhood of from 6.8 to 7.6 feet per second. Under the conditions of the test, spillage at the draft hood must not occur but the amount of air drawn in at the draft hood may be quite low. It is believed necessary in practice to provide for at least 25 per cent dilution at the hood and that 100 per cent excess air be taken into the appliance. Further, the vent collars are sized for 5,000 B.t.u. per square inch per hour. With above amounts of air in the products of combustion each cubic foot of stack gas will represent 41.5 B.t.u. input to the appliance. On this basis the velocity through the vent collar will be about 4.8 feet per second.

From the above analysis of the test procedure and performance required in practice, the calculation of vent and flue capacities beginning at the outlet of the draft has been set up on the basis that the draft produced shall be sufficient to overcome the resistance of the vent and flue plus one velocity head. There is a slight safety factor in the allowance of one full velocity head for those draft hoods that may draw in considerable air during the test but it seems necessary to do this to cover those that may not show spillage and may draw in little air.

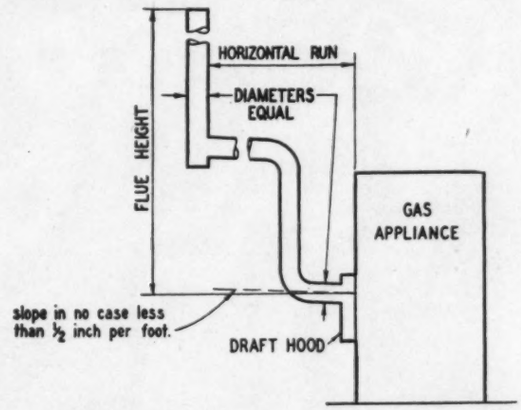
The nomenclature in presenting the present equation is the same as in the previous report.

It is assumed that the flue and vent are of the same size. The vent is 20 feet long with 1 foot rise and contains three elbows.

*(Turn to Page 16)*

TABLE NO. 1.
CAPACITY OF DOMESTIC VENTS AND FLUES WITH A.G.A. APPROVED APPLIANCES

| Height from Appliance Outlet to Top of Flue (in Feet) | Diameter of Vent and Flue in Inches | | | | | | |
|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
| | B.t.u. Rated Input Per Hour | | | | | | |
| 10 | 31,000 | 60,000 | 100,000 | 150,000 | 210,000 | 280,000 | 460,000 |
| 15 | 36,000 | 70,000 | 120,000 | 175,000 | 250,000 | 335,000 | 550,000 |
| 20 | 40,000 | 80,000 | 130,000 | 195,000 | 280,000 | 375,000 | 615,000 |
| 30 | 45,000 | 90,000 | 150,000 | 225,000 | 320,000 | 435,000 | 720,000 |
| 40 | 48,000 | 95,000 | 160,000 | 245,000 | 350,000 | 475,000 | 790,000 |
| 50 | 50,000 | 100,000 | 170,000 | 260,000 | 375,000 | 510,000 | 850,000 |




These curves are to be used only for modern domestic appliances which have draft hoods incorporated in the appliance as standard equipment and have been approved by the A.G.A. Testing Laboratory.

To be used for metal and terra-cotta lined flues. With rough brick flues, capacities are to be reduced 15 per cent.

Based on the condition that the length of horizontal run is not greater than 20 feet, except for a flue height less than 20 feet in which case the horizontal run is not to have a greater length than the height of the flue. Friction factor used=f=0.0083.

Two long radius elbows are included in the horizontal run, the diameter of which is equal to that of the flue.

Each additional elbow reduces the allowable horizontal run by a length in feet equal to the diameter in inches.

Where the horizontal run has an effective length in excess of that given (or additional elbows) the next larger size of flue should be chosen.

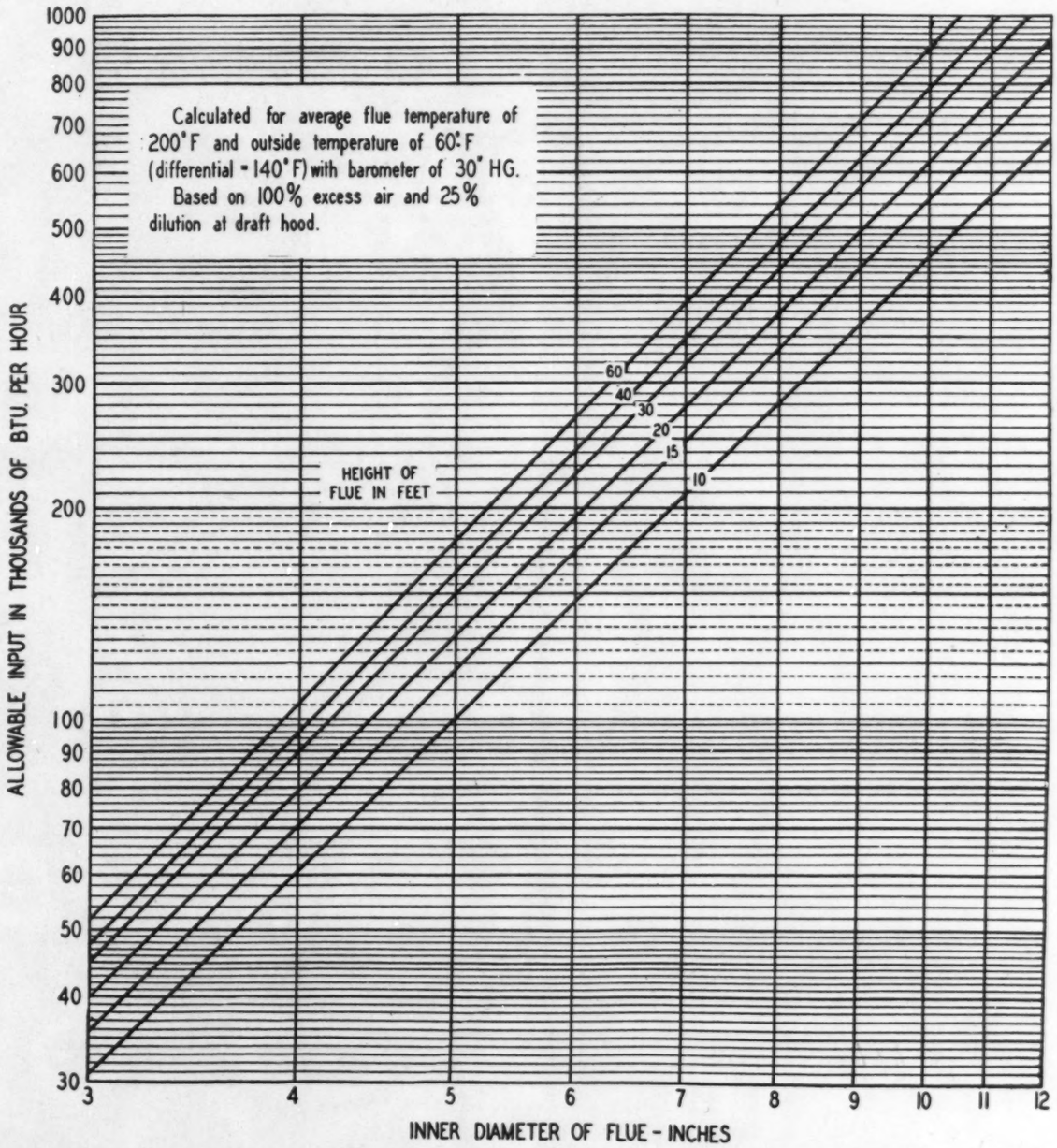



FIG. 1. ALLOWABLE B.T.U. INPUT TO CIRCULAR FLUES FOR DOMESTIC GAS APPLIANCES—A.G.A. APPROVED

(Manufactured and Natural Gas)

Using the same procedure as before, the total resistance is:

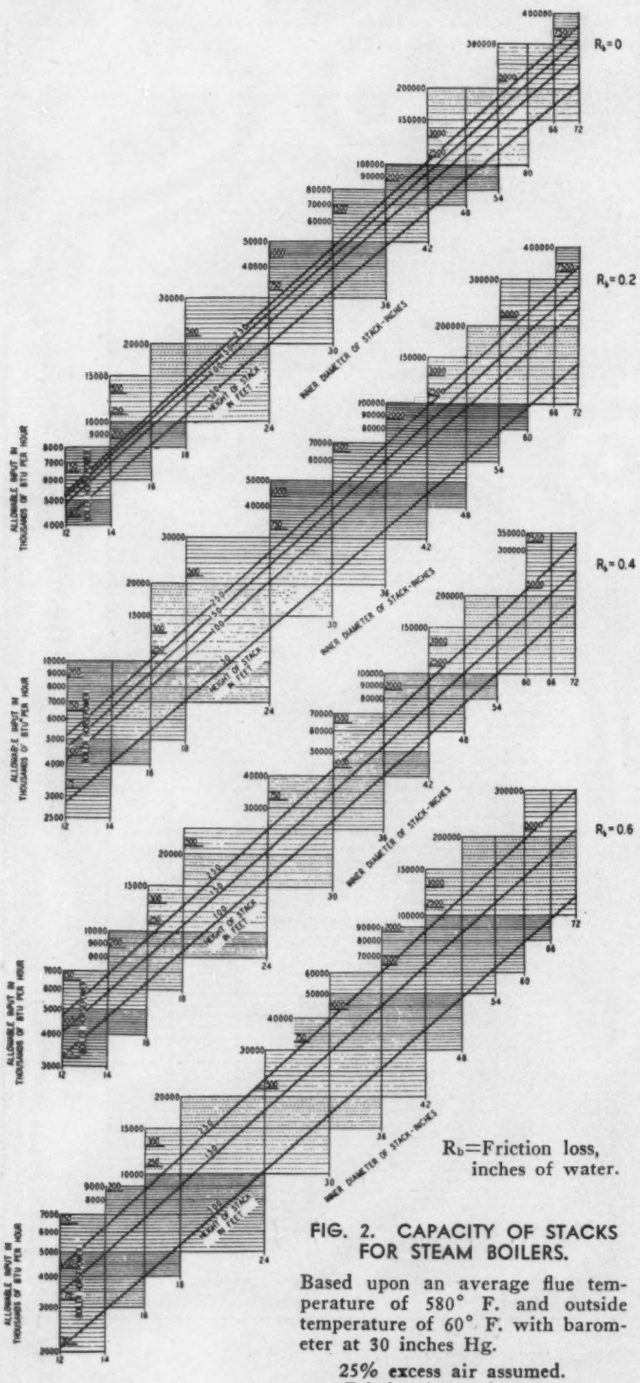
$$R=\frac{0.4}{D}(H+19)+0.4\,(3)+1=\frac{0.4}{D}(H+19)+2.2$$

Then:

$$\frac{\text{B.t.u. per Hr.}}{41.5}=\frac{(104000)\,(.7854)\,D^2}{660}\left[\frac{.27H}{\frac{0.4}{D}(H+19)+2.2}\right]^{1/2}$$

Simplified

$$\text{B.t.u. per Hr.}=42222\left[\frac{D^5\,H}{H+5.5\,D+19}\right]^{1/2}$$




$R_b$=Friction loss, inches of water.

FIG. 2. CAPACITY OF STACKS FOR STEAM BOILERS.

Based upon an average flue temperature of 580° F. and outside temperature of 60° F. with barometer at 30 inches Hg.

25% excess air assumed.
Friction factor f=0.006.

In Table No. 1 on Page 14 are set up the capacities of flues as calculated by this equation. The same material is shown in graphical form in Fig. 1 (Page 15).

*Stacks for Steam Boilers*

There have been many inquiries in regard to stacks for steam boilers that are converted to natural gas fuel.

The curves in Fig. 2 are based upon the assumption that natural gas is being burned with 25 per cent excess air, that combustion is complete, and the average temperature in the stack is 580° F. This temperature gives the maximum stack effect for any given height with atmosphere at 60° F. and, therefore, the maximum capacity. For other stack temperatures the capacity taken from Fig. 2 may be corrected by multiplying by

$$\frac{1040}{T_2}\left[\frac{T_2}{T_1}-1\right]^{1/2}$$

where $T_2$ and $T_1$ are actual stack gas and atmospheric temperatures (abs.) respectively. No attempt was made to allow for heat loss from the stack so the horsepower values spotted on the figure are based on an overall thermal efficiency of 77.7 per cent (43,000 B.t.u. input per hour per boiler horsepower). The friction factor (.006) is safe for ordinary steel stacks but, for lined or very rough stacks, the capacity would be about 35 per cent less.

When the builders' specifications are not available, the most difficult portion of the problem in checking the capacity of a stack is the choice of the allowance for friction loss for the heating surfaces (draft required at breeching, below the damper). This is dependent upon the general design and arrangement of the baffles, condition of the surfaces and rating at which the boiler is operated, and has a considerable influence upon the dimensions required for the stack. Mark's Mechanical Engineer's Handbook gives the following draft losses and ratings for well designed water tube boilers:

| *Rating* | *100%* | *150%* | *200%* |
|---|---|---|---|
| Probable Friction Loss, Inches of Water Column | 0.25 | 0.45 | 0.65 |

Very few of the boiler plants that are converted from other fuels to natural gas show losses greater than 0.4 inch. In Fig. 2 are four sets of curves giving capacities for 0.0, 0.2, 0.4, and 0.6 inches friction loss. Interpolation for other losses on a straight line basis will be sufficiently accurate for practical purposes.

Heights from 50 to 250 feet may be considered as practical limits. Surrounding buildings, trees, and terrain should be considered in choosing a minimum height.

It is assumed that the stack rises directly from the breeching with two boilers in a bank. If a single stack serves several boilers, the friction loss of the horizontal run may be added to that of the boiler.

The equations used are as follows:

For boilers having no frictional loss:

$$R_b=0$$
$$\text{B.t.u. per Hr.}=6208\,D^2\left[\frac{H}{1+.288\,H/D}\right]^{1/2}$$

For boilers having .2 inch friction loss:

$$R_b=0.2$$
$$\text{B.t.u. per Hr.}=6208\,D^2\left[\frac{H-27.16}{1+.288\,H/D}\right]^{1/2}$$

For boilers having .4 inch friction loss:

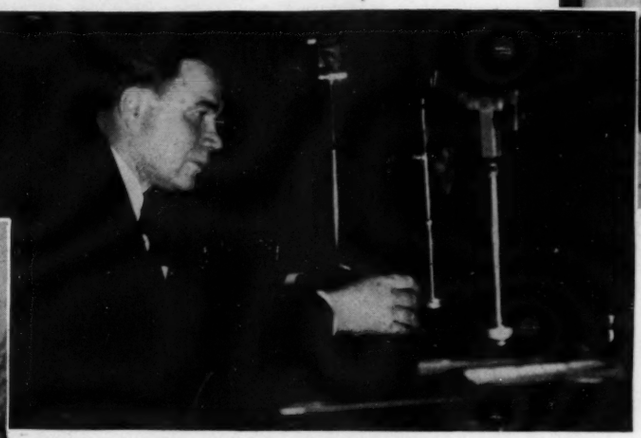
$$R_b=0.4$$
$$\text{B.t.u. per Hr.}=6208\,D^2\left[\frac{H-54.32}{1+.288\,H/D}\right]^{1/2}$$

For boilers having .6 inch friction loss:

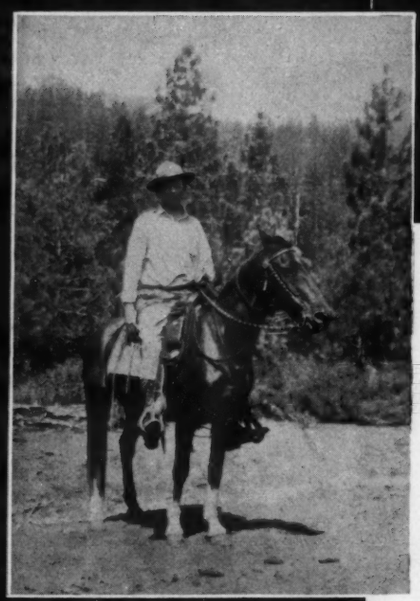
$$R_b=0.6$$
$$\text{B.t.u. per Hr.}=6208\,D^2\left[\frac{H-81.48}{1+.288\,H/D}\right]^{1/2}$$

# GAS CAMERA

ABOVE: Unconventionally conventional, Sally Rand amuses a large crowd by mixing and baking an "Angel's Food" cake in a contest sponsored by San Diego Consolidated Gas and Electric Co. at the San Diego Exposition. Cake safe in oven, she left to amuse other crowds with a bubble dance.

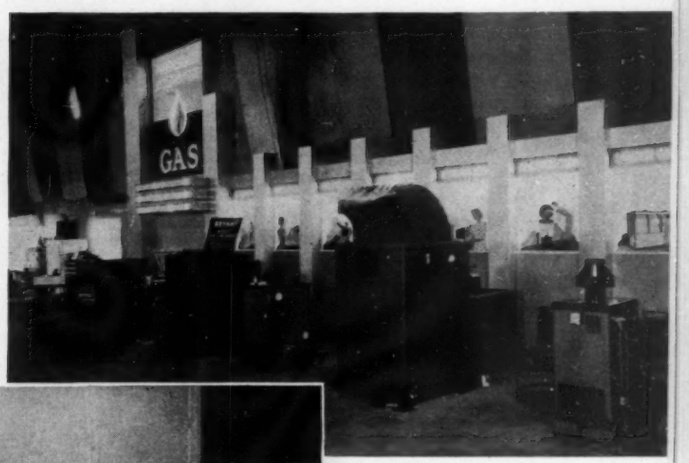


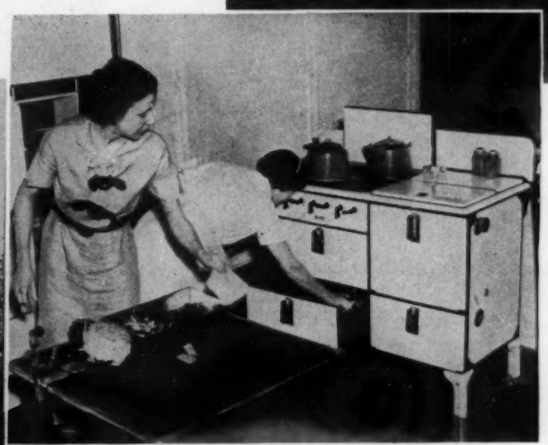
Opening the Consumer Power Co.'s two-month celebration honoring its Golden Anniversary of public service in Michigan, Dan E. Karn, vice-president and general manager, speaks via microphone to the company's 5,500 employees from his office in Jackson.



LEFT: C. B. Babcock, Entertainment Committee Chairman for the Pacific Coast Gas Association Convention in San Francisco next month, is scouring the country for talent. This snap was taken in the "Valley of the Moon," where perhaps "Bab" is looking for Jack London.

BELOW: At the Pittsburgh Home and Electric Show, the Pittsburgh natural gas companies' booths featured modern gas appliances and gas house heating equipment. Over 110,000 people attended the show which was sponsored by the Electric League of Pittsburgh, the Builders Exchange, and the F. H. A.



LEFT: First sample of National Gas Industry Advertising Campaign publicity is this view of Mrs. Alberta Moore of Santa Rosa, Calif., 1936 National Culinary champion, preparing her $500 prize winning roast. Runner-up Mrs. M. E. Smith, Dayton, Ohio watches the boiling pots. The contest was held at the Women's National Exposition of Arts and Industries in New York.

LEFT: Muskegon (Mich.) Gas Co. recently advertised a free trip for all buyers of major gas appliances to visit Grand Rapids Gas Co.'s All Gas Wonder House (in background). Five chartered buses took 180 customers on the tour.

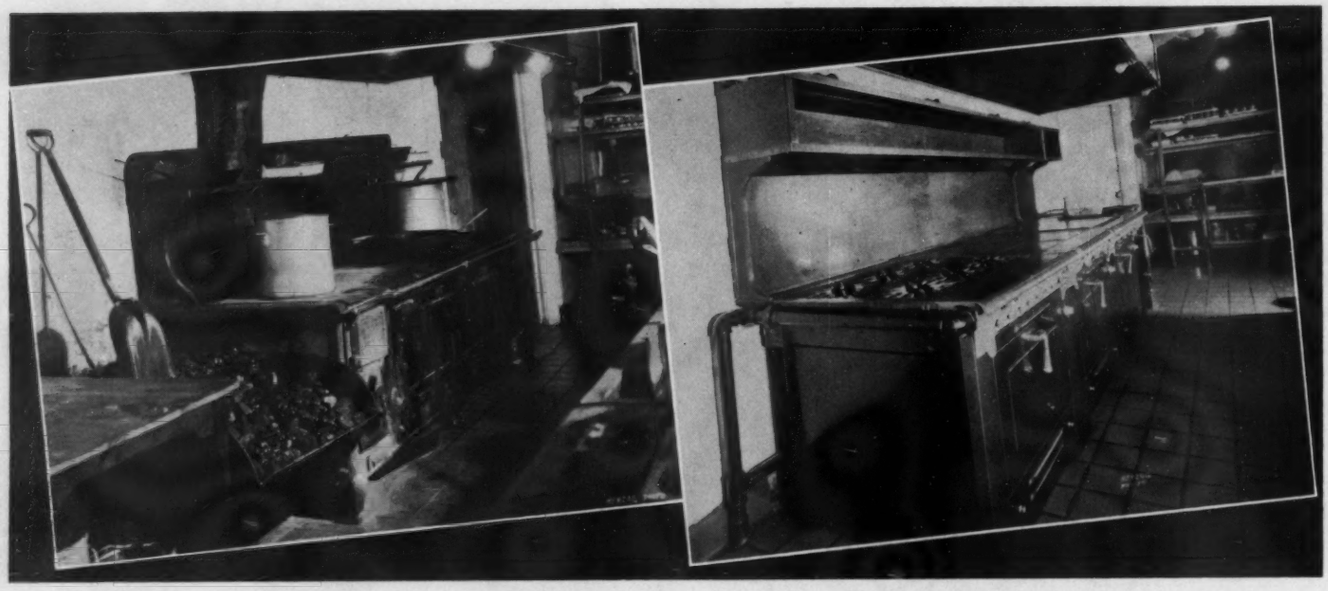


FIG. 1. Soft-coal-fired ranges in cafeteria kitchen, replaced by gas.

FIG. 2. Garland gas ranges, replacing coal-fired units seen in Fig. 1.

# MEETING .. AND BEATING .. COMPETITIVE FUELS IN THE COMMERCIAL KITCHEN

By LAWRENCE R. FOOTE

Industrial Gas Engineer, Central Illinois Electric and Gas Company, Rockford, Illinois

ABOUT two years ago conditions in this midwest city of some 86,000 population, as regards the commercial cooking load, were pretty indicative of conditions which existed in almost any city of similar size in the country.

LAWRENCE R. FOOTE

Hard times, the ever present overcrowded condition of the restaurant field, and the indifference on the part of gas companies in general to this most desirable of loads, had contributed to the growing tendency on the part of hotel and restaurant operators to forsake gas as a kitchen fuel, and seek cheaper substitutes. While these cheaper substitutes, for the most part, proved to be mere will-o'-the-wisps, as we will show later on in this article, nevertheless a very real threat existed which was making serious inroads into our commercial cooking load. How to meet this situation, save existing load and gain back lost load was, then, the problem facing us in the summer of 1934. At that time seven important kitchen installations had already gone to oil, six minor and one major job was on coal and one on electricity. More were threatening, and mighty prompt action was called for.

In laying our plan of attack we resorted to that ancient but honorable weapon—the survey. And many and startling were the facts revealed to us by it. Out of a total of some 23,000 gas meters in the city, 600 were listed as commercial accounts. Restaurants, ranging from the little better than "hamburger joints" to the "best" eating places in town accounted for approximately 200 of these 600 accounts. Four hotels were important but shaky accounts, and a couple of dozen churches, hospitals and clubs were fair prey to our competitors. But the awful truth revealed by the survey was that with but just one exception—may we repeat this for emphasis—with but one exception, the cooking equipment in every instance was old, worn out and obsolete in design. Ovens and ranges were uninsulated and lacked heat controls; much equipment was out of adjustment. Little contact work had been done in years past; public relations were at a point approaching non-existence. The picture, indeed, was a sorry one.

No comfort could be derived from our rate setup, which while not inflexible, allowed for no immediate or proposed reductions. The average price being paid for commercial gas was slightly over 15c per therm or 90c per M.c.f. (565 B.t.u. manufactured gas).

Hardly was our survey well under way when we were thrust into a competitive situation, which proved eventually to be a blessing in disguise, as it marked the beginning of the end of oil competition in the cooking field in our city. One of our more important customers in the strictly downtown area, an old established concern well thought of by the trade, conducting a combination restaurant, bakery and confectionery store, installed on trial, without being thoughtful enough to notify us first, a battery of oil-fired ranges and an oil-fired bake oven. Cooking in this restaurant was conducted on three floors, and almost at the expiration of this trial period we discovered that one floor had been usurped by the oil man with the equipment mentioned above. Eventual plans called for the complete substitution of oil on all three floors. Practically the entire restaurant and hotel fraternity was watching the outcome of this installation, so we realized the positive necessity of eliminating this job. More as a time-gaining expedient we proposed the installation of test meters on all the

major gas-fired cooking and baking equipment in the restaurant. Owing to the lack of time available this test was carried on for a period of 18 days. Daily readings were taken on the test meters which represented the cooking, roasting and baking capacity of the restaurant.

The total gas consumption for the 18-day test period was 60,200 cubic feet, or a daily average of 3344 cubic feet. It is interesting to note at this point, that this daily average use of gas for range cooking and baking represented only 58 per cent of the total gas load of this restaurant. So our friend the oil man proposed to make a revolutionary saving on only a portion of 58 per cent of the total fuel requirements of this restaurant. We were beginning to feel better already. Emboldened by our findings, we now proposed quite an unorthodox procedure, namely, the installation of new modern gas-fired equipment to be paid for by the customer out of savings made by this new gas equipment over the old gas equipment (not the oil equipment). The customer did not share our enthusiasm over the savings through the installation of new equipment, and it was not without the greatest difficulty that we were finally able to put this deal across. When we finally did, we succeeded in accomplishing in one stroke the complete removal of all trial oil equipment in one kitchen, and the complete replacement in three kitchens of all existing gas-fired cooking and baking equipment. Comparable units of the new equipment were checked for daily consumption, the total gas consumption for the 18-day test period with new equipment being 41,200 cubic feet, or a daily average of 2288 cubic feet.

The percentage savings in monthly fuel consumption made by the installation figured 31.5 per cent. Translated into dollars and cents this saving formed the basis of a substantial monthly payment on the equipment. The owner of this restaurant, so pleased with the results obtained, increased his monthly payment by a sum equal to the amount of the savings, and succeeded in speedily amortizing the cost of this equipment.

With the first successful installation behind us and armed with some authentic and accurate information we pressed for further advantage in battering down competition. Our next move was the arrangement of an invitation meeting of the hotel and restaurant owners and operators of the city. This meeting was attended far in excess of our expectations. We attempted in a brief talk to get across to those present a few pertinent facts regarding the advantages of modern gas equipment in their kitchens, in fuel and time savings, improvement of food quality and working conditions. We stressed the fact that "their" gas company was human and interested in something besides the bill at the end of the month. Actual figures of the recent installation of modern equipment were presented and discussed. The fruits of this meeting were so rich as to cause us to eventually establish it as an annual feature and a part of our regular sales effort.

Persistent effort and careful recommendations on each individual job began to show results, and the "bogie man" appearance of our competition no longer frightened us. We were learning that a calm and truthful analysis of both our own and the other fellow's costs was resulting in orders for gas equipment. As time went on and job followed job, we were able to gradually do away with the necessity of installing test meters and making actual cost comparisons. As our list of successful replacements increased, and our experience in successfully handling all types of installations grew, we found the operators more willing to accept our recommendations on their merit. "Nothing succeeds like success" and to-day we find ourselves in a strong position in regard to our commercial cooking load. The impetus gained by a few good gas jobs can be just as swift and just as sure as the impetus of vicious competition once it starts.

One or two other specific installations may be of interest in passing. The major coal job in the city was located in the kitchen of the local unit of a fairly important midwest cafeteria chain. This consisted of a battery of soft-coal-fired ranges (See Fig. 1). With no thought of beating or even meeting bare fuel cost of this job, we finally persuaded the local manager of the cafeteria to install an equivalent battery of modern gas ranges plus a heat controlled deep fat fryer. (See Fig. 2).

Fuel cost on the coal ranges was running $23 to $25 per month. Oven heat on these ranges was a matter of conjecture, and insulation was an unknown quantity. No provision was available for fry work, and the working temperature around the ranges knew no bounds.

Having done a fairly good job on the selling of tangibles and intangibles and the form value of our fuel in connection

*(Continued on Page 58)*

**FIG. 3. Oil-fired ranges in university kitchen, replaced by gas installation seen at the right.**

**FIG. 4. Battery of modern Garland gas ranges, which replaced oil-fired installation (Fig. 3).**

**ILLUSTRATIONS**

**Homemakers' Institute, seen in session at the left, brought 1,000 Lubbock homemakers together for the final day's program. Modern gas appliances were in evidence in stage sets and displays such as that in lower view.**

# HOMEMAKERS' INSTITUTE

## . . . a course in "stream-lined living" staged by West Texas Gas Company

"LET'S put on another cooking school" is often the only suggestion that comes to mind when some gas promotional activity seems called for. At Lubbock, Texas, the West Texas Gas Co. recently went the conventional cooking school one better and staged a "Homemakers' Institute", which entered a new realm of customer service. Measured by attendance and by the cumulative interest of company patrons, the idea clicked. In fact, it registered so well that Homemakers' Institute may become an anuual event.

The immediate occasion for the Institute idea was the fact that Clean Up and Paint Up Week, Better Housing Week, and the F. H. A. Insured Mortgage Clinic, were all transpiring simultaneously in Lubbock. Clearly, it was up to the gas company to tie in with a strong program for gas as a modern household servant. How effectively Homemakers' Institute met the requirements is suggested below in an account furnished *G A S* by Ruth J. Cooper, home economics director for Tracy-Locke-Dawson, Inc.; this firm is advertising counsel for the West Texas Gas Co., of which utility R. F. Hinchey is vice-president and general manager.

The Homemakers' Institute was held in Lubbock from May 19 to 22. Lubbock is one of the cultural centers of West Texas, being the home of the fast-growing, co-educational Texas Technological College. As a real service to the homemakers of Lubbock, a "three-ring circus" cooking school seemed out of place, so it was imperative that something educational be attempted.

The community's well-cared-for homes indicate that its citizens are home conscious. It so happened that one of these homes was the sweepstakes prize-winner in the remodeling division of Better Homes and Gardens Magazine's 1935 national better homes contest. (This was written up in the April issue of the magazine.) This, then furnished the inspiration around which the advertising counsel visualized the Institute.

The Institute program was planned around the general subject of *Modern Homes* featuring Lubbock's prize-winning architect as guest speaker and "Streamlined Living—the Objective of the Modern Homemaker" as the opening lecture; "Better Home Gardens," with one of the horticulture teachers from the college as guest speaker; "Better Home Management", with emphasis on short cuts in home serving; and "Safeguarding Health in the Home", featuring nutrition and the care of food through refrigeration. To further suggest the broad selection of subject matter which came before those attending the Institute, other lectures were on such topics as "New Tricks with Interiors", "Color", "Short Cuts in Sewing", "Better Cooking."

All merchants were asked to co-operate in window displays and their general advertising. The Lubbock *Avalanche Journal* was quite liberal with publicity for the Institute. Nothing was 'ballyhooed" from the stage by trade name. Instead, the women were told to see the appliances at their Lubbock dealer's place of business. The women were taught to use gas economically and the oven, broiler, and top-of-stove cookery were demonstrated, as well as cold cookery through the Electrolux refrigerator.

The lecturer selected was Mrs. Ruetta Day Blinks, university teacher, lecturer, writer, and radio personality. She recently inaugurated "The House of Happiness," a woman's hour program over WFAA, and is co-author of the Lippincott Home Manual Text Book, "Food Purchasing for the Home" which is used in all college home economics classes. Mrs. R. A. Burford, a graduate of Texas Technological College living in Lubbock, assisted Mrs. Blinks on the platform and formed a very valuable link with the college. Through her, the college gave its whole-hearted coopera-

*(Continued on Page 63)*

# TRANSMISSION LINE FLOW FACTORS

## ...with particular reference to differences in elevation

By J. B. REDDICK

Southern California Gas Company*

IT IS not the purpose of this paper to cover in detail all of those factors which may affect the flow of gas in a pipe line. However, one factor, that of differences in elevation, will be primarily considered, and a new formula of the Weymouth form which will take care of this factor is presented.

In Table No. 1 there are three columns of those factors affecting the flow in the pipe line. They are marked "+", "−" and "+" or "−", the first two meaning that the factor is additive to or subtractive from the volume as computed by the Weymouth formula, while the third column is either one or the other as the case may be.

For the effect of deviation, reference is made to the excellent handling of this subject in a paper by Phillip E. Beckman presented before the Pacific Coast Gas Association, and appearing in *Western Gas* for August, 1932.

The use of the wrong pressure base, flowing temperature or gravity may affect the computed volume one way or the other, and caution should be used to see that their selection covers the conditions encountered.

The effect of corrosion is an intangible except for the fact that it is always a subtractive factor. Corrosion can be almost entirely controlled, if not wholly so, by sufficiently dehydrating the gas so that the dew point is below the ground temperature, and any up-to-date pipe line design should consider the installation of the proper equipment to minimize or eliminate this factor.

The length of line used in computing flow is often taken as the horizontal distance in lieu of more accurate measurements over the slopes. Investigations will show, depending upon the terrain traversed by the line, that the excess length due to slopes can amount to as much as 2½ to 3 per cent. Therefore, precaution should be taken to obtain a reasonably accurate slope measurement or a suitable allowance should be made.

TABLE 1

| + Deviation | Valves Fittings Bends Angles Excess Length due to Topography Corrosion | ± Pressure Base Flowing Temperature Gravity Elevation |
|---|---|---|

$$Q = \frac{3.498\ T_b}{P_b\ T}\left[\frac{d^{5.5}\,h\,(P_1^2 - P_2^2\,E^{-s})}{L\,(E^m - 1)}\right]^{1/2}$$

h = Difference in elevation +ascending −descending

$E = 2.7183$

$m = \frac{0.375\,h\,G}{T}$

Other notations identical with Weymouth Formula

FIG. Nº 1

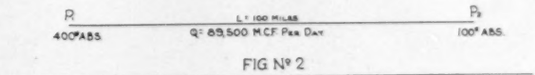



FIG. Nº 2

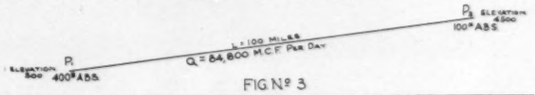



FIG. Nº 3

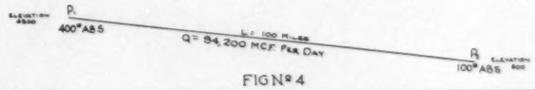



FIG. Nº 4

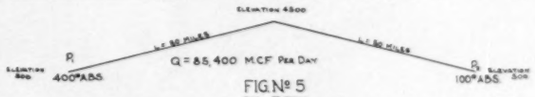



FIG. Nº 5

The effect of valves, fittings, bends and angles is well brought out in the paper by Frank Wills presented before the Pacific Coast Gas Association, and appearing in the September, 1934 issue of *Western Gas* under the title of "The Friction Factor for the Stanpac Natural Gas Line." As Mr. Wills mentions, this line traverses a rolling terrain which can be considered comparatively level. The equivalent added length of line due to these factors as computed by Mr. Wills is 6.5 in 186 miles or 3.5 per cent.

In the case of the transmission lines running south from the San Joaquin Valley to the Los Angeles area, traversing the difficult mountainous terrain and populated areas en route, dipping under existing substructures or around other obstacles, it is not hard to conceive that this added equivalent length may well be twice that of the Stanpac

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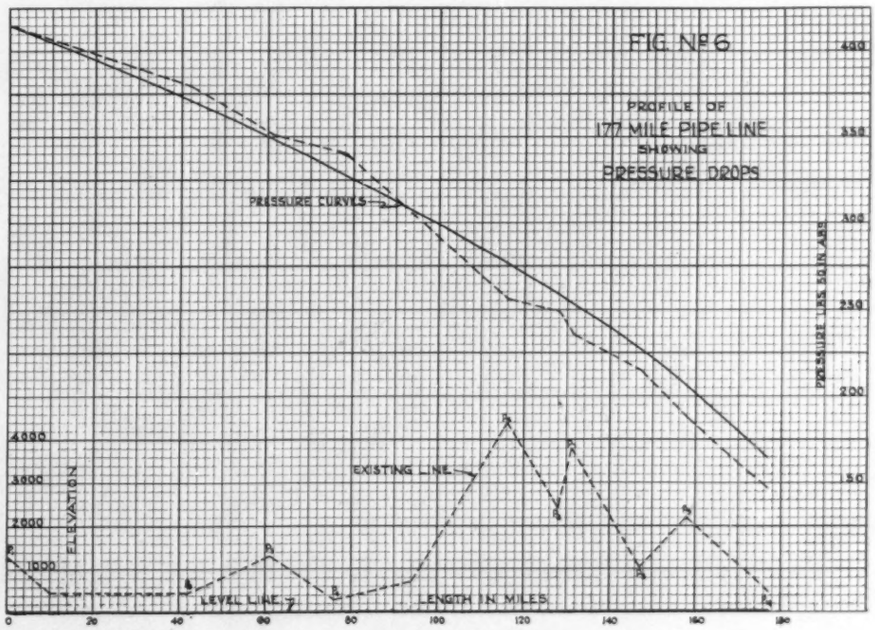



*Presented before the Pacific Coast Gas Association's 1936 Spring Technical Conference.

"I WANT TO KNOW ABOUT NATURAL GAS"
Answers to Questions That Are Being Asked By Our Customers
GAS COMPANY
47 N. Division
Phone 9-1331

**AT LEFT:**

**While the pipeliners were busy linking Grand Rapids to the natural gas fields, Grand Rapids Gas Light Co. lost no time in telling its customers about the new fuel. At the left is one of the company's advertisements which uses the Socratic method to get across some essential natural gas facts.**

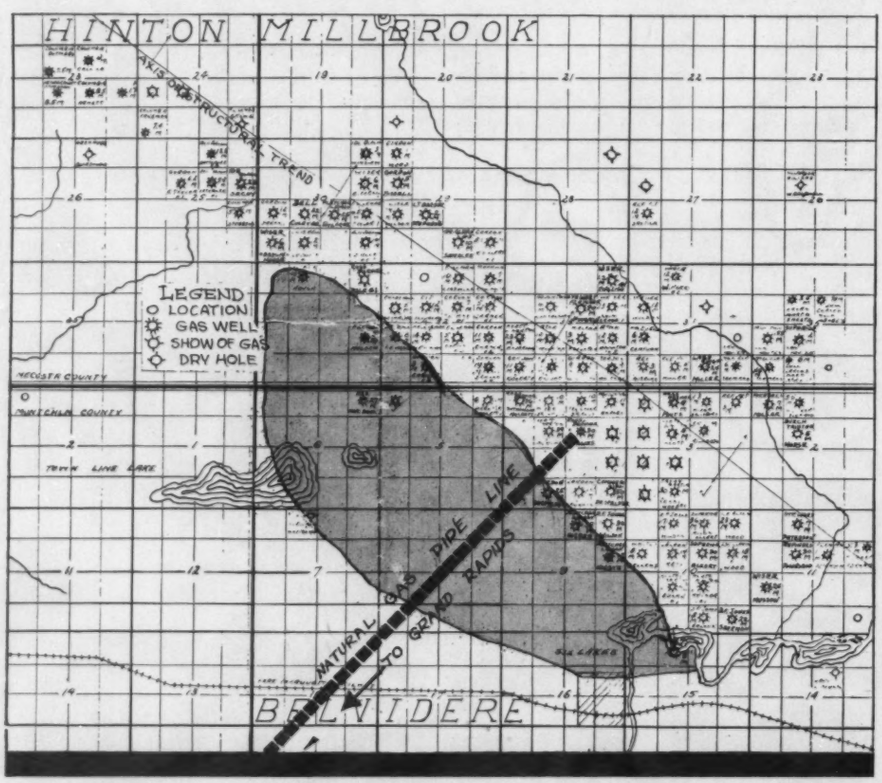
# GRAND RAPIDS TRANSMISSION LINE

THE 45-mile Grand Rapids gas line completed in June stands ready to deliver either a greater or lesser amount of B.t.u.'s to this important Michigan center, depending upon whether the city goes on straight natural or mixed gas.

The Public Utilities Commission of the state of Michigan has granted Grand Rapids Gas Light Co. a permit to serve mixed gas, basing the permit on what they concluded was available supply. The city council is demanding straight natural gas.

With the final outcome not fully determined this article will confine itself to the construction of the gas line, to plans being made for change-over and to sales and advertising, leaving a later issue to chronicle the facts about the type of service.

The line has its actual starting point 3½ miles north and west of the town of Six Lakes, located in the Hinton-Belvidere-Milbrook county field. The direction taken to Grand Rapids is southwesterly with the line crossing Montcalm and Kent counties to reach its destination.




• **Michigan's Hinton-Belvidere Millbrook field; well locations revised to June 16.**

There is many a hill and valley in the course of the line, causing innumerable over-bends and side-bends, all of which have been made cold with the use of tractors, winches and trucks.

The line crosses 18 swamps, one of which, lying southeast of Black Creek, is 9,000 feet across. Total swamp land is approximately 5 miles in length. There were seven swamps in a distance of 6 miles in one stretch of the line.

In the swamp-land it was necessary to dig all trench by hand, first pumping surface water away from the course. Excessive snows of last winter had contributed to the over-abundance of water.

The line through the swamps is weighted with 430-lb. clamps to keep it in place. Clamps are located 30 to 50 feet apart across the swamps and rivers, with 480-lb. clamps being used as weight material at river crossings. The main river crossing is the extension across the Rogue River at a point 2 miles north of Rockford.

Swamp-land crossings as well as river crossings are protected with Barrett enamel. Certain other corrosive stretches are also coated with the enamel and a portion of the line extending through a cinder-covered area in the city proper is protected against electrolysis with the same product. The total amount of line protected amounts to 8 miles.

Quicksand was also encountered at certain spots. Here the ditch diggers

**AT RIGHT:**

**Vice-President A. G. Schroeder of the Grand Rapids Gas Light Co. (center) looks on as R. F. Henneman, superintendent of pipe line construction (left) explains a construction problem on the company's new natural gas carrier. Also listening in is J. E. Spindle, general superintendent, seen at extreme right of above view.**

● **Along the Grand Rapids line, a few miles from the terminus.**

# COMPLETED

worked with long-handled shovels, from the side of the trench. Approximately a quarter mile of quicksand has been dealt with in this way.

Boulder-infested areas called for considerable blasting. One stretch of a mile and a half was largely made up of boulders. Caving sand in some localities also has made construction very difficult.

Engineers began surveying the line on April 6. Right-of-way construction began April 22 and pipe-laying on April 26. The line was completed the last of June in time for the change-over which was contemplated for July 1 or thereabouts.

The line is 10¾ O.D. from the source of supply to the town border station under construction, located 770 feet outside the city limit. A 16-inch O.D. line is being constructed from the station to the city gas plant, a distance of 3½ miles.

All road crossings and railway crossings were cased with 14-inch steel pipe and vented. The casing was sealed at each end.

The main pipe order was shipped from Republic Steel mills, with approximately 8 miles of seamless steel pipe coming from National Tube. The 16-inch pipe was purchased from Youngstown Sheet & Tube Co.

All of the pipe was mill-primed. The 10¾-inch O.D. pipe weighed approximately 22.86 lbs. per foot, with .205-inch walls. The 16-inch pipe weighed 52.35 lbs. per foot with 5/16-inch wall thickness. The entire line was Linde welded and is constructed for 450 lbs. pressure. Merco Nordstrom worm gear operated valves placed at 6-mile intervals control the line.

The 16-inch line constructed through the city has called for much engineering ingenuity. It has been laid underneath the sidewalk and service lines including water, gas and telephone conduits, laying across the course, in some cases one over another, have necessitated the digging of the trench 5 to 12 feet and in some cases as deep as 17 feet.

Thickly located shade trees have presented another construction problem. Welded lengths of pipe have been pulled as far as 600 feet in jockeying the pipe into position over the trench. City regulations have also required that 90-degree tube turns be used in crossing the streets. The pipe has also been mitered under the streets.

United Light & Power Engineering and Construction Co., of Davenport, has had charge of constructing the line. R. F. Henneman is general superintendent with J. C. Musgrove general foreman of construction. Three hundred and thirty men were employed in constructing the line.

The change-over in the city of Grand Rapids will be handled in much the same way as the Muskegon, Mich., change-over of November, 1934, both of the properties being subsidiary to the American Light & Traction Co. of Chicago.

The gas coming in at 50 lbs. pressure will be reduced at regulator headers to regular distribution pressure. The gas will be distributed through an intermediate system to 18 district governors acting as distribution centers with outlet pressure of 8 lbs.

The city has been divided into 24 sections with approximately 2,000 meters to the district. One section will be converted at a time, each one requiring approximately two days to completely change over.

A separate crew of men will call back at homes where residents were away and adjustments not completed. Another crew will take care of service complaints.

A total of 250 men will be employed in the change-over, according to C. E. Ludwig, superintendent of service. Two hundred men will be engaged in the

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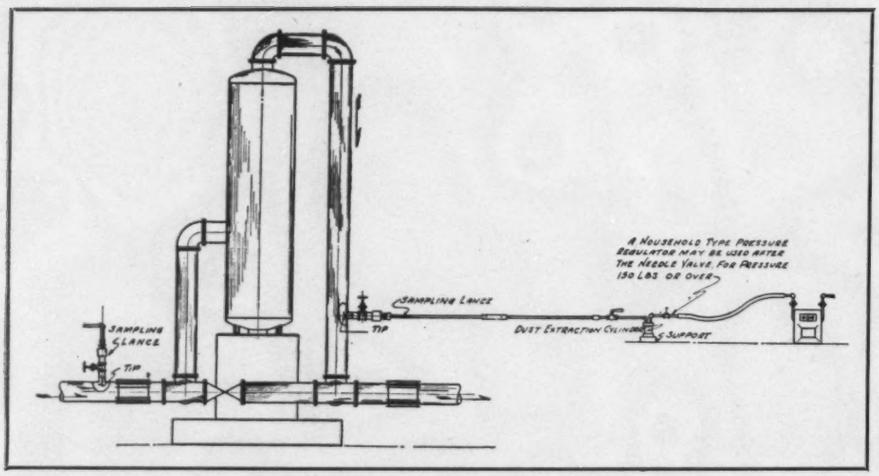

A HOUSEHOLD TYPE PRESSURE REGULATOR MAY BE USED AFTER THE NEEDLE VALVE FOR PRESSURE 150 LBS OR OVER
SAMPLING LANCE
TIP
DUST EXTRACTION CYLINDER
SUPPORT
SAMPLING LANCE
TIP

FIG. 1 (At Left): Assembly of apparatus for sampling dust in gas main.

# The Quantification of Dust in Gas Transmission Lines

● **I. H. LEVIN, director of research, Blaw-Knox Co., Pittsburgh, Pa.; addressing American Gas Association Joint Committee Conference of the Production and Chemical Committees, New York, N. Y., May 25-27, 1936—(Abstract by G A S).**

STUDIES have been made of the dust in two different gas transmission lines: In one, the gas was mixture of by-product and refinery gas at a pressure of between 30 and 70 lbs. per sq. in.; in the other the gas was natural gas of between 200 and 300 lbs. per square inch pressure.

The procedure developed is as follows:

Paper thimbles are used for collecting the dust. Before use, they are reduced to constant weight by conditioning with gas or air of constant moisture content.

The gas line is tapped at convenient points, and by means of appropriate equipment a sample of gas is passed through the thimble, and the dust in the gas is thereby collected.

After the dust sample is collected, the thimble plus the dust is weighed.

The weight obtained for the dust sample may consist of moisture, dust and oily matter. The oily matter may be extracted in a Soxhlet Extractor by a suitable solvent, to reduce the dust to an "oil-free basis" as meaured by the action of the particular solvent used.

The extracted dust sample and thimble are again reduced to constant weight, and microscopic examination is made for particle size determinations, etc.

Fig. 1 shows the assembly of apparatus for sampling dust in gas mains. Gas to be tested enters the tip which is placed directly in the line of flow of the gas facing the approaching stream of solid particles in the gas. This arrangement can be put into a vertical pipe as shown and also in a horizontal line. Equipment can also be used when the pipe line is well below the ground.

The lance is inserted through a 2-inch gate valve, through which it can enter or be withdrawn from the line without leakage of gas. At every point where it is decided to take samples, a short nipple of 2-inch pipe is welded to the line. A 2-inch gate valve is then screwed on, and a hold of 1½-inch diameter is drilled in the line wall through the gate valve and nipple.

Fig. 2 shows (a) a sectional assembly of the lance as inserted in the sampling connection of the pipe line, and (b) the dust extraction cylinder containing the paper thimble.

For sampling in horizontal portions of the line, the tip of the sampling lance is placed at a point ⅛ of the pipe diameter from the top of the line, and for sampling from vertical parts, the tip is placed at ⅛ of a diameter inside the pipe wall at the most convenient point. The velocity of the gas at these points is assumed to be equal to the average velocity over the line. The tip of the sampling lance has an internal diameter of about 0.28-inch.

A thimble which has been conditioned to constant weight is placed on the metal plug of the extraction cylinder; the brass wire coil is placed on it and tightened to hold the thimble in place; and the extraction cylinder is screwed together tightly, using a pipe joint compound on the threads to avoid leaks. The extraction cylinder is always opened or closed at the upper cap, the bottom being screwed on tight at all times.

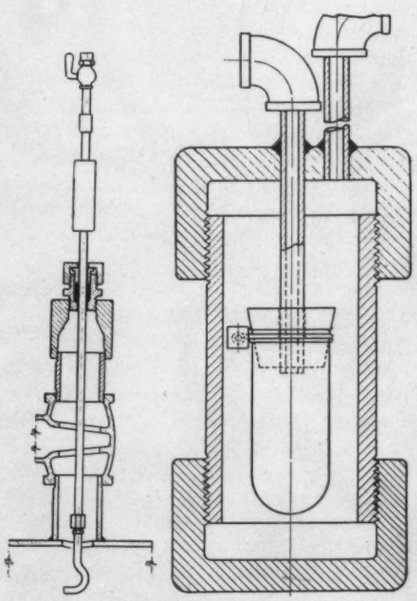
In sampling, the rates were adjusted so that the velocity in the tip was equal to the average velocity in the line.

The maximum actual flow rates through the 33 x 80 m.m. thimbles, which were nearly at line pressure, varied from about 0.55 c.f.m. at 30 lbs. to about 0.45 c.f.m. at 70 lbs. It is believed that these rates are conservative, and that the thimble is capable of retaining dust efficiently at considerably higher rates.

The rates of flow through the sampling meters were from about 1.6 to 2.5 c.f.m. Samples of from 120 to 480 standard cubic feet were taken. The pressure of metering the sample was taken as atmospheric, and the temperature was taken at the outlet of the meter. The time required for taking a sample was from 1 to 4 hours, depending on the quantity of gas flowing in the line and on the estimated amount of dust in the gas.

At one point in the line, preceding a gas cleaner, the samples of dust were from about 1 gram to 50 grams, and the dust loadings that were found varied from about 6 lbs. (42,000 grains) to about 600 lbs. (4,200,000 grains) per million cubic feet.

A number of samples taken at the outlet of a gas cleaner in the same line showed an average of about 0.065 lbs. (455 grains) per million cubic feet; and at a point 15 miles downstream from the cleaner was found to have increased to an average of about 0.23 lbs. (1610 grains) per million. The dust loadings given above are based on "oil-free", or extracted dust.



(a) (b)

FIG. 2.

# Cathodic Protection Experiences On the Southern Counties System

● H. J. KEELING, Southern Counties Gas Co., Los Angeles, Calif.; addressing Pacific Coast Gas Association Technical Section 1936 Spring Conference—(Abstract by GAS).

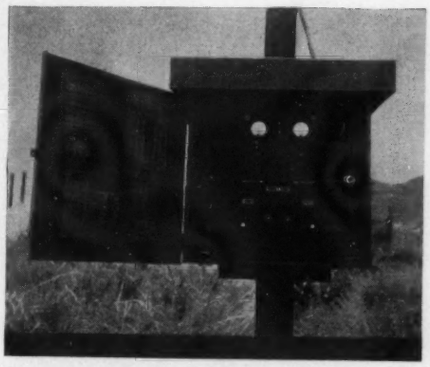


FIG. 1. Interior of typical pole-mounted copper oxide rectifier unit. The D. C. fuse is mounted between the voltmeter and the ammeter on the panel. The links and binding posts directly below the fuse are used to regulate the secondary voltage. The binding posts and the knife switches near the bottom of the panel are used in calibrating the station instruments.

FIG. 2. A close-up of a 1-cell gravity battery cathodic protection station showing a test ammeter on the left, connected up ready for the calibration of the station ammeter. The zinc electrodes of the battery are suspended on a wood rack which rests on the top edge of the jar.

EARLY in 1932, the management of the Southern Counties Gas Co. became interested in the possibility of using cathodic protection as a means of mitigating pipe line corrosion. Following an investigation of the practices employed by the several utilities that were then using the system, the company completed the construction of two cathodic protection stations in the fall of 1932. Additional installations have been made since that time, and at present, March, 1936, there are 22 stations protecting a total length of 64 miles of pipe on six different pipe lines. This paper reviews experiences with various designs of cathodic protection equipment.

"It has been found that for the average sized installation copper oxide rectifiers are very satisfactory. The short life and high replacement cost of vacuum tube rectifiers made them both unsuitable for this type of service, where they are in continuous use 24 hours a day, every day of the year. The same is true of mercury arc rectifiers, which in addition are very inefficient when operated at small loads. On the other hand, the copper oxide rectifier is inexpensive, rugged, and probably has an unlimited life. The first few copper oxide rectifiers installed had a maximum over-all efficiency of about 40 per cent. Recently, however, due to improvement in transformer design, this efficiency has been raised to 55 or even 60 per cent. No difficulty has been experienced with overheating or unstability due to temperature changes. This is probably because the rectifier discs are operated at very low current ratings so as to obtain high efficiency, and also because adequate ventilation is provided.

The majority of these rectifiers have been individually designed to best meet the conditions under which they operate, in an endeavor to keep them working at very nearly full load, because the efficiency drops off quite rapidly as the load decreases. The rectifier output voltage is adjusted by changing the secondary taps on the transformer. These connections are brought to binding posts spaced in a circular arrangement on the panel, so that by means of two movable links and 12 binding posts it is possible to get any voltage between ½ and 10 volts, in ½-volt steps. The ratings of rectifier installations vary from 5 amperes at 6 volts to 35 amperes at 10 volts. Most of them are operating at about 15 amperes and 7 volts. Fig. 1 shows the interior of a typical pole mounted unit.

Motor generator sets are unsatisfactory as a source of direct current for cathodic protection if the voltage is very low and the atmosphere damp, mainly because of commutator trouble on the generators. Although the commutators were of adequate size, the combination of dusty, foggy atmosphere along the seacoast, together with the low operating voltage, made it impossible to keep them working properly for any reasonable length of time. It was very difficult to choose the proper generator brushes. The softer brushes caused the commutator to become dirty and gummed up in a short time. They also produced excessive carbon dust which, in the damp atmosphere, frequently caused the brushes to stick to their holders. The harder brushes, while free from these objections, had a tendency to cut and score the commutators.

While the majority of the cathodic protection stations are supplied by rectified alternating current, in four cases it was necessary to find substitutes because the stations were located in places where electric power was unavailable. In three of these cases, the current requirements were very low, so that it was possible to use batteries of one or two gravity cells, installed in underground vaults. These cells, constructed from 20-gallon crocks and each containing about 120 pounds of commercial slab zinc, require very little attention. Copper sulphate crystals and water are added to the cells once a week by the pipe line patrolman, who also records the station ammeter readings. At present, two such installations are protecting about 3 miles of 12-inch pipe line. The pipe coating in this section has a very high resistance so that the two battery stations draining 0.2 ampere and 0.1 ampere respectively are able to maintain the pipe 0.2 volt negative to the soil. One of these stations has been in operation 3½ years, and the other for a little over one year. A similar two-cell battery installation draining 0.4 ampere, protects about 1,000 feet of 6-inch pipe line at a submarine crossing. This last station has been in operation for three months.

Fig. 2 shows a one-cell installation.

A gas-engine-driven generating set is used for the cathodic protection of a 12-inch pipe line at a location where it passes through open cattle ranches. Electric power is unavailable in this area, and the current requirements in this case are too large to permit the use of batteries. The unit is rated at 35 amperes at 32 volts, but at present is draining 22 amperes at 7 volts and consumes about 12,000 cu. ft. of 1125 B.t.u. gas per month. This station provides protection for about 3½ miles of the pipe line, and has been in operation for a year. The equipment consists of a separately excited generator directly coupled to a two-cylinder 2¾ x 3½ Le Roi gas engine operated at 850 r.p.m. The engine has protective devices to shut down the unit in case of excessive water temperatures or low oil supply. The radiator is equipped with a 15-gallon extension tank so that in the hottest weather, additional water will not be

**TABLE NO. 1. ESTIMATED CATHODIC COSTS FOR SOME OF THE SOUTHERN COUNTIES GAS CO. PIPE LINES FOR YEAR 1935.**
**(Based on Actual Costs for Last 8 Months)**

| Name of Pipe Line | Size (Inches) | Coating | Date Coating Installed | Date Cathodic Protection Started | Miles of Main Protected | Number of Drainage Stations | Station Rating Volts | Station Rating Amps. | Cathodic Protection Investment $ Per Mile of Main | Cathodic Protection Annual Cost* $ Per Mile of Main |
|---|---|---|---|---|---|---|---|---|---|---|
| Ventura Oxnard | 6⅝ | Asphalt primer, 2 coats air blown asphalt | Aug., 1925 | Dec., 1933 | 9.0 | 4 | 7.5 | 17.5 | $362.00 | $101.20 |
| Carpinteria | 6⅝ | One coat air blown asphalt | Feb., 1924 | Aug., 1934 | 1.8 | 1 | 7.5 | 17.5 | 295.00 | 233.00 |
| Cerritos Channel Crossing | 6⅝ | Three coats coal tar and 2 layers asbestos felt wrapper applied alternately | Mar., 1935 | Dec., 1935 | 0.14 | 1 | 2 gravity cells draining 0.4 amps. | | 694.00 | 589.00** |
| San Diego Pipe Line | 12¾ | Coal tar primer, 2 coats coal tar enamel, asbestos felt wrapper | Sept., 1932 | July, 1933 | 5.6 | 1 | 6 | 5 | | |
| San Diego Pipe Line | 12¾ | Same as above | Sept., 1932 | Dec., 1932 | 10.7 | 1 | 5 | 10 | | |
| San Diego Pipe Line | 12¾ | Penetration primer, electrolysis paint, asphalt paint, Oznaberg crash wrapper | Feb., 1930 | Jan., 1934 | 14.1 | 6 | 10 | 35 | | |
| San Diego Pipe Line | 12¾ | Coal tar primer, 2 coats coal tar enamel, asbestos felt wrapper | Sept., 1932 | Sept., 1932 | 1.4 | 1 | 1-cell gravity battery draining 0.07 amps. | | | |
| San Diego Pipe Line | 12¾ | Same as above | Sept., 1932 | July, 1935 | 1.7 | 1 | 2-cell gravity battery draining 0.2 amps. | | | |
| | | San Diego Pipe Line Total | | | 33.5 | 10 | | | $191.00 | $76.20 |
| | | System Total | | | 56.2 | 22 | | | $243.00 | $93.00 |

* Annual cost includes operating cost and fixed charges. The operating cost includes all testing and survey work, etc.
** This figure is probably higher than the actual average figure for a whole year, since it is based on the first three months' operation of the station. It therefore includes considerable development and testing expense which would not be repeated during the year. The extremely short length of the section also makes the cost per mile rather high.

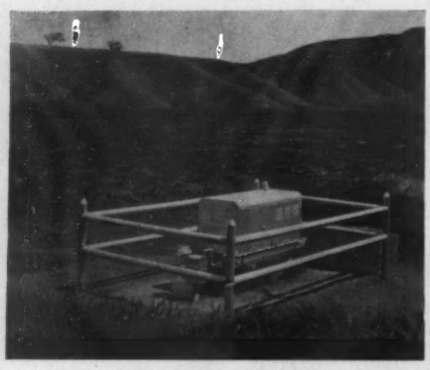


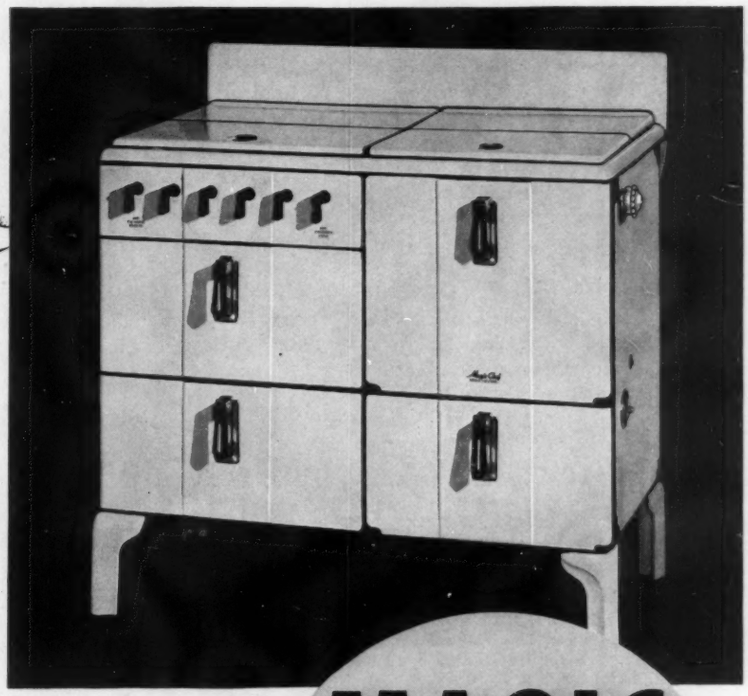
**FIG. 3. Gas engine driven generating set used for cathodic protection of 3½ miles of Southern Counties Gas Co. 12-inch Ventura-Los Angeles pipe line.**

required oftener than once a week. The crank case is supplemented by an external 5-gallon oil reservoir connected to the intake of the oil pump. The crankcase oil is returned to the reservoir by gravity. Fig. 3 is a general view, and Fig. 4 a close-up of this station. It receives no other attention than a weekly visit by the pipe line patrolman, who checks water and oil levels and records the instrument readings.

Since most of the energy required for cathodic protection is lost in overcoming the resistance of the connecting wires and the ground electrodes, effort is always made to keep these resistances as low as possible consistent with a reasonable capital outlay. The cost of the ground electrodes and connecting wires is, in most installations, equal to, or greater than the cost of the rectifier and its accessories. The electrode installations are, in every case but one, never closer than 100 feet from the pipe line. The one exception is a case where an abandoned pipe line is used as a ground connection. Latest installations have been made with the nearest ground electrode 200 feet from the pipe line. A typical ground installation consists of 10 pieces of junk 6-inch pipe 15 to 20 feet long, buried vertically in the ground, and spaced 20 feet apart. The grounds are set in a row at right angles to the pipe line, and about 200 pounds of rock salt is backfilled into each hole. Salt water is added to the ground electrodes every two or three months, in the dry season, in order to keep the resistance down. When the 6-inch pipes are corroded, 4-inch pipes are dropped down the inside of the old ones without the necessity of additional excavation. Although some of the ground installations are over three years old, it has not yet been found necessary to make many replacements.

**FIG. 4. Close-up of gas engine driven cathodic protection station, showing the switchboard and 5-gallon oil tank in the foreground. The 15-gallon auxiliary water tank is in the upper part of the picture. Connections between this tank and the radiator can be seen in the upper right-hand corner.**

It is well known that rods of graphite



# MAGIC CHEF

*...has everything Mrs. Modern wants*

**MAGIC CHEF**
**GAS RANGE**
**SERIES 2500**

● Magic Chef is the gas range Mrs. Modern is buying today because it typifies and embodies everything she admires and wants in a modern range. It embodies her ideas of present day style and beauty, measures up to her standards of convenience and efficiency, fully meets her requirements of service and economy.

Magic Chef sets a safe course for Mrs. Modern in buying a gas range because of its unquestioned leadership in design, advanced features, genuine quality and dependable performance. It sets a true course in gas range selling for gas companies and retailers because it keeps abreast of changing conditions in the cooking appliance field, grades up and sustains the market in quality gas ranges, builds up and holds consumer confidence necessary to successfully meet competition.

With all these advantages Magic Chef also has the *plus* of National Advertising to strengthen the position of the gas company and make its selling job easier.

**LOOK FOR THE RED WHEEL WHEN YOU BUY A MAGIC CHEF**

**AMERICAN STOVE COMPANY**
BOSTON • NEW YORK • ATLANTA • CLEVELAND • CHICAGO
ST. LOUIS • PHILADELPHIA • SAN FRANCISCO • LOS ANGELES

*Magic Chef*
AMERICAN STOVE COMPANY

or carbon may be substituted for the iron pipe ground electrodes, thereby eliminating the necessity for periodic replacement of the iron pipes which are corroded by the electrolytic action of the current leaving them. Since carbon anodes are not attacked in this way, they can be considered to be permanent grounds, and should never have to be replaced for this reason. However, our experience has been that carbon or graphite ground electrodes are, in most cases, inferior to the junk pipe installation because their one advantage of permanence is usually offset by three undesirable features. First, the cost of the graphite ground electrode is over 10 times as much as the equivalent junk pipe installation; second, it is difficult to make a satisfactory but inexpensive connection between the copper wires and the carbons; and third, the most serious disadvantage is that the galvanic potential between the carbon grounds and the iron pipe line sets up an opposing voltage which reduces the flow of drainage current.

Table No. 1 shows the cost data for some typical cathodic protection installations, together with other pertinent information.

# Expansion Fittings Provide for Pipe Movement Due to Temperature Change

● **L. W. TUTTLE, Public Service Co. of Northern Illinois, Chicago, Ill.; addressing American Gas Association 13th Annual Distribution Conference, Memphis, Tenn., April 6-8, 1936.—(Abstract by G A S).**

THERE are several causes of pipe movement, the most important being:

1. Expansion or contraction of the pipe due to: (a) Seasonable changes in the temperature of the ground. (This affects underground piping). (b) Seasonable and daily changes in the temperature of the air. (This affects exposed piping). (c) Temperature of the gas carried in the piping. (This is applicable to the outlet piping of boosters and compressors).

2. Movement of structures to which the piping is attached or with which it is in contact.

The change in length of iron pipe is approximately 7/8-inch per 100 feet per 100° F. change in temperature. If during such a temperature change the pipe is restrained from movement, calculations indicate that a stress of over 20,000 pounds per square inch is set up in the pipe. For ordinary mild steel pipe this stress is above that allowable in design practice. Due to concentration of stress, additive bending stresses, etc., the actual stress in the piping may be considerably higher than calculated. It is therefore necessary to provide means for allowing piping to move so that these expansion stresses may be relieved.

There are a number of expansion fittings available that provide for pipe movement. The most common fittings employed (and these cover a wide range of service), are as follows:

1. Mechanical joints and couplings.
2. Long couplings or sleeves.
3. Light slip type expansion joints.
4. Heavy guided slip expansion joints.
5. Corrugated fittings.
6. Bellows or diaphragm type fittings.
7. Pipe bends, and creased bends.

If a gas main is buried to a depth of about 3 feet, the seasonable variation of the temperature of the main probably does not exceed 50° F. This change in temperature effects a change of about 3/8-inch per 100 feet of the pipe.

In a cast iron pipe system the mechanical joints and couplings, spaced 12 to 18 feet apart, effectively relieve temperature stresses.

In a steel pipe system involving small pipe sizes long couplings or sleeves are sometimes installed at regular intervals in order to allow pipe movement.

Where small diameter solid welded steel mains are installed it is customary to snake the pipe in the ditch or to compress the pipe with "slack loops." In the middle west the general practice seems to tend toward a combination welded and coupled main.

Exposed piping is subject to a wider range of temperatures than is underground piping. A seasonable variation in temperature of 130°-150° F. may be expected (in Chicago for example) and the movement of exposed piping subject to this variation in temperature is about three times that of underground piping. In addition daily variations in temperature cause frequent reversals of movement in the pipe and structures. It is also possible that the piping and supporting structure do not have the same range of temperature variation, as is the case when the piping is insulated, and this introduces certain relative movements between the pipe and structure. For exposed piping it is therefore usually necessary to use some type of an expansion fitting along with rollers or other means for allowing for the travel of the pipe with respect to the structure. To be certain that the pipe movement occurs at the proper expansion joints it is also necessary to anchor the pipe at certain points or otherwise limit the travel of the pipe at an expansion joint. All these factors along with the type and length of the bridge or structure must be considered in the design and construction of the exposed piping.

Fig. 1 shows a gas main on a bridge with varied and considerable freedom of movement. The gas main expansion joints are installed at the free ends of the bridge sections. Where the vertical movement of the bridge is appreciable, hinged joints are provided on each side of the expansion joint. The main is anchored so that the full movements of the free ends of the bridge are taken in these expansion and/or hinged joints. Between these expansion joint installations the pipe, which is 10-inch steel pipe, is joined with couplings and each length of pipe is anchored to the bridge

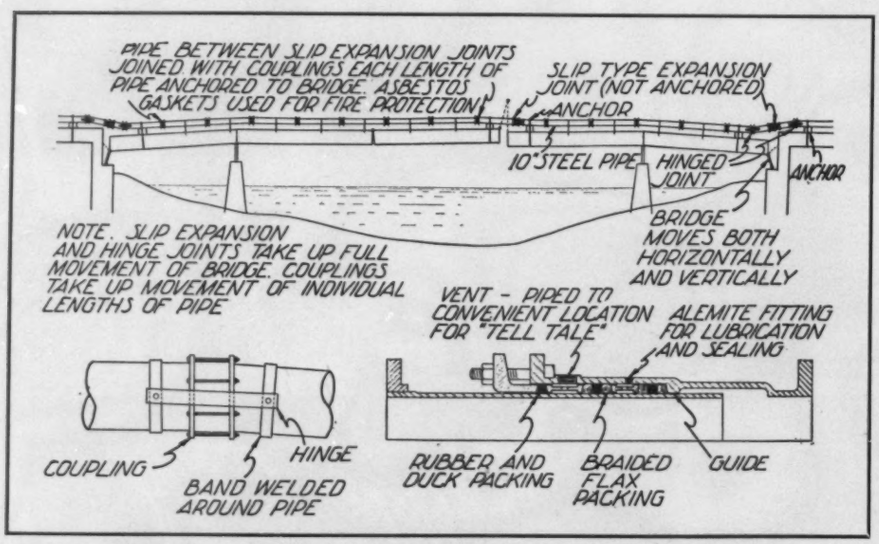

PIPE BETWEEN SLIP EXPANSION JOINTS JOINED WITH COUPLINGS EACH LENGTH OF PIPE ANCHORED TO BRIDGE. ASBESTOS GASKETS USED FOR FIRE PROTECTION
SLIP TYPE EXPANSION JOINT (NOT ANCHORED)
ANCHOR
10" STEEL PIPE
HINGED JOINT
ANCHOR
BRIDGE MOVES BOTH HORIZONTALLY AND VERTICALLY
NOTE. SLIP EXPANSION AND HINGE JOINTS TAKE UP FULL MOVEMENT OF BRIDGE. COUPLINGS TAKE UP MOVEMENT OF INDIVIDUAL LENGTHS OF PIPE
VENT - PIPED TO CONVENIENT LOCATION FOR "TELL TALE"
ALEMITE FITTING FOR LUBRICATION AND SEALING
COUPLING
HINGE
BAND WELDED AROUND PIPE
RUBBER AND DUCK PACKING
BRAIDED FLAX PACKING
GUIDE

**FIG 1. Gas main on bridge having horizontal and vertical movements.**

Models available: Gas valve, sizes 3/8", 1/2", 3/4", 1" or 1-1/4"; Two and three-wire low voltage switches for use with standard motor valves. Two-wire line voltage mercury tube switch, ten amperes, 110 volts.

# BASO
# BALTIMORE AUTOMATIC SHUT OFF

## THE *Accepted* SAFETY CONTROL FOR ALL PILOTED GAS BURNERS

MGSCo. bunsen pilots, especially built to locate thermocouple properly in pilot flame. Type No. 19119 shown, many other models available.

● The New BASO, built on the thermoelectric principle, is rapidly pushing its way forward to No. 1 position in the field of automatic devices to prevent the escape of unburned gas.

It is now available on many gas furnaces, boilers, conversion burners, water heaters, ranges, etc., offered by this country's foremost appliance builders.

The flexible, easily bent leads from the thermocouple to the electromagnetic unit make easy the application to ANY appliance. Order a single unit and see how easily this Super Safe Shut-Off will answer your safety pilot problem.

To appliance manufacturers:

Our Engineering Department and the MGSCo. Testing Laboratory are at your service to help you apply the BASO.

## MILWAUKEE GAS SPECIALTY CO.

MILWAUKEE
WISCONSIN

PACIFIC COAST REPRESENTATIVE
H. V. PAYNE, 3834 3rd Avenue,
LOS ANGELES, CALIF.

so that the couplings provide only for the relative movement between the pipe and the bridge. Asbestos gaskets are used in these couplings in order to minimize fire hazards.

The slip type expansion joints are provided with vents to pipe any leakage of gas past the packing to a safe location. These vents are also "tell tales" on the tightness of the joint. The hinged joint consists of two short lengths of pipe joined with a coupling. This coupling permits angular movement. The pipe is restrained from moving in or out of this coupling by two "latches" across the coupling.

# New Equipment Aids Sale of Gas in Refined Heating Operations

HAVING sold a good portion of the large bulk surplus rate loads, natural gas companies in many sections should give thought to protecting their most profitable medium-sized year-round industrial loads of good load factor.

● **CHAS. A. BLESCH, Natural Gas Equipment, Inc., San Francisco, Calif.; addressing Pacific Coast Gas Association Spring Sales and Advertising Conference, Los Angeles, Calif., March 20, 1936.—(Abstract by G A S).**

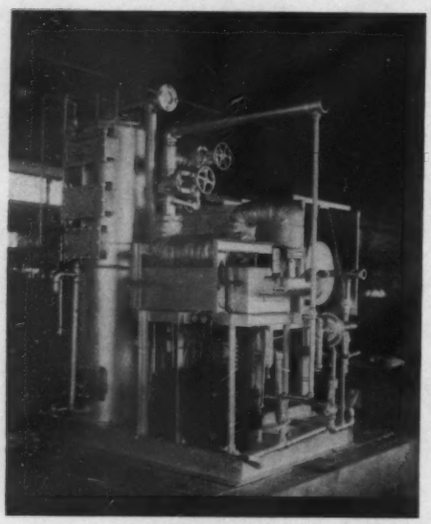


**FIG. 1. DX Machine for producing furnace atmosphere gases.**

This means concentrating on what might be termed the more refined heating operations where often fuel costs sink into insignificance compared to other factors involved and where, incidentally, electricity is liable to be as keen a competitor as oil. Constant research and development, anticipating industries' requirements, is the price of continued leadership for gas fuel in this field of activity. The most recent major developments are as follows:

*Radiant Tube Applications*: This type of heating is made possible by adaptation of diffusion combustion to internally fired tubes, the tubes being of hair-pin shape to provide freedom of expansion and contraction without movement or leakage at the tube mountings. Diffusion combustion takes place when the gas stream is surrounded by an air stream moving at the same velocity without turbulence, so that combustion at the surface of the gas stream takes place, and the cracking action liberates free carbon which becomes incandescent. In this way, heat is delivered along the entire length of the tube, for the most part by radiation; tube life is long; furnace atmospheres can be controlled, without contamination by flue products even if tubes leak, as there is a slight vacuum in the tubes. The principal application so far has been in sheet and tin plate and coil strip annealing.

*Controlled Atmosphere Equipment (DX Machines):* There is a need in the industry for inexpensive non-explosive furnace atmosphere gases of variable compositions suitable for processing different materials. The DX Machine provides such a gas, producing seven volumes from one volume of natural gas. It consists of a reaction chamber with automatic proportioning firing equipment and pressure control arrangements, water cooling and scrubbing towers and, in most cases, a refrigeration unit to drop the water content. It is entirely automatic. Fig. 1 shows a typical machine of 2,000 cu. ft. per hr. capacity, producing a gas of the following composition: Nitrogen 74%, hydrogen 9.6%, carbon monoxide 8.7%, carbon dioxide 5.8%, methane 1.9%.

*Gas Carburizing:* A new type furnace permitting close control of this operation consists of a tight alloy muffle chamber accurately and uniformly heated to a proper carburizing temperature, fired externally around the muffle, and processed internally with a mixture of two gases (Eutectrol process) that react to give the desired carbon penetration. Fig. 2 shows such a furnace. Suitable gas locks are provided at the inlet and outlet, the work being loaded on movable trays.

Among other recent industrial gas applications are controlled atmosphere high speed steel hardening furnaces, consisting of a silicon carbide muffle, externally fired, with a prepared gas reaction tube built into the combustion chamber, and arranged to flood the muffle with a separately controlled gas atmosphere.

Direct gas-fired air heaters have also been introduced, made up of two cylindrical shells, one inside the other, with a suitable gas burner discharging into the inner shell. The air to be heated discharges tangentially into the space between the two shells, picks up the products of combustion from the burner, and the resulting volume of air and products of combustion, uniformly heated, emerges from the inner shell.

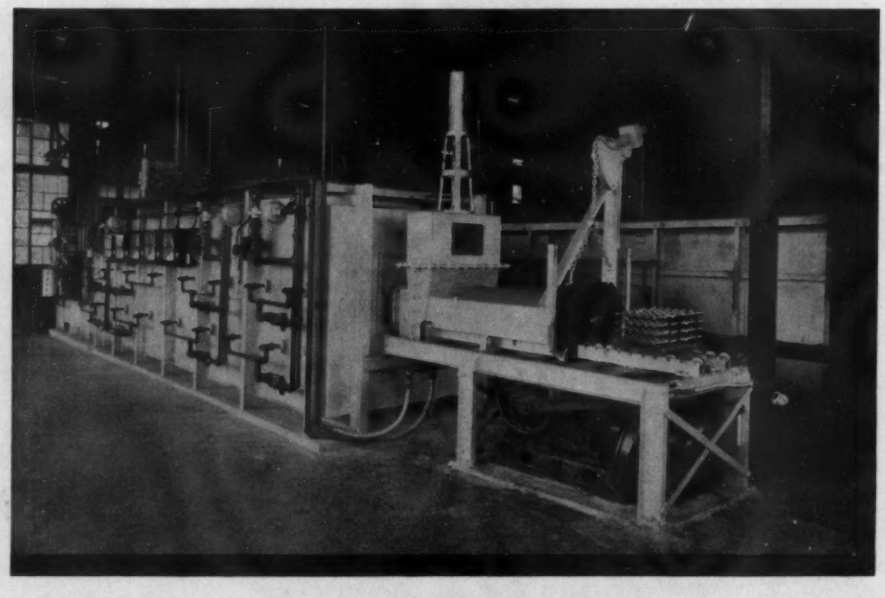
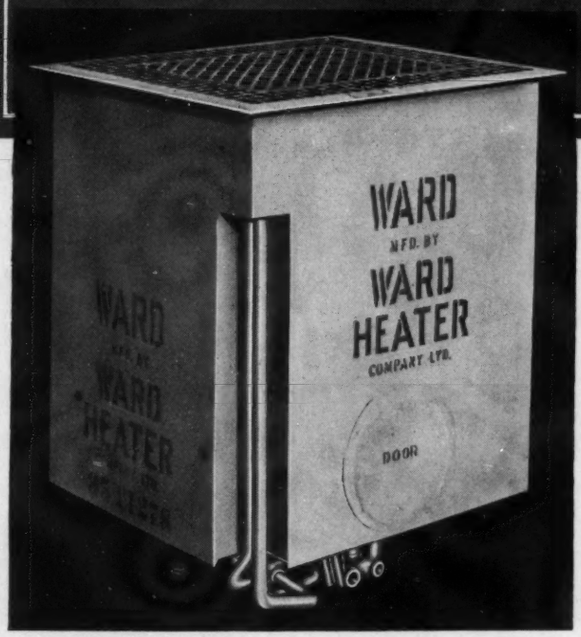


**FIG. 2. Gas carburizing furnace (charge end).**

"... the automatically controlled floor furnace of 1936... is the type of house heating equipment through which we may most efficiently entrench ourselves in the homes of our customers"

DEAN A. STRICKLAND
New Business Manager
United Gas Public Service Co.




# Correct!

## AND HERE IT IS

## A PERMANENT LOAD BUILDER

### THE 1936 AUTOMATICALLY CONTROLLED

# WARD
# FLOOR FURNACE

● More than 300,000 installations of WARD FLOOR FURNACES prove Mr. Strickland's words. When you install a WARD you *are efficiently entrenched in the home of your customer* because WARDS are *permanent* equipment! Guaranteed ten years... built of heavy gauge TONCAN iron to outlast the house in which they are installed. WARD warmth, *automatically controlled, vented and circulated,* is giving complete satisfaction not only in California where the first WARD was built in 1909... but also in states where temperatures fall far below zero.

● The 1936 WARD FLOOR FURNACE is a "complete package"... everything sturdily built in. No assembling to do. No wires to run. Installation is simple... just drop the WARD into the floor... connect to vent and gas line, and it is ready to go to work, efficiently building your load and preserving your consumer satisfaction. An experienced gas fitter can have a WARD installed without muss or fuss in less than a day. WARD furnaces are A.G.A. tested with all accessories and controls in, *just as they are installed in the home.* No changes, nothing added to "complete package" as approved by the American Gas Association Laboratory.

● Ward exclusive "complete package" features include BILT-IN THERMO-CONTROL, the most accurate thermostat ever developed for floor furnaces... AUTOMATIC PILOT, a dependable safety device subjected to five severe tests before installation... CRADLE CIRCULATION, which insures steady, healthful air flow and increases heating efficiency up to 20%... FLAME FENDER, which prevents burning out, insures long life and efficiency.

*This year more gas companies will install more WARD FLOOR FURNACES than ever before. Will yours be one of them? Write us for good reasons why it should be.*

WARD

**HEATER COMPANY, LTD.**
**1800 WEST WASHINGTON • LOS ANGELES**

WARD REPRESENTATIVES: J. E. Davies, Peoples Gas Bldg., Chicago • A. S. Kincaid, 2012 Harwood Ave., Dallas • F. E. Reilly, 200 Davis St., San Francisco

**YOUR LOAD IS AS GOOD AS THE APPLIANCE YOU SELL**

GAS RANGE SALESMEN
LEAD THE UNITED STATES
Sheboygan
housewives select new gas ranges and
set national buying record
If it is done with Heat in Sheboygan
most people do it with gas
WISCONSIN PUBLIC SERVICE CORPORATION

**Full page color advertisement carried in Sheboygan Press honoring national contest sales winners**

# Publicity Stunt Built Around Contest Winners

A TOP notch sales performance during the month of March by five salesmen brought the Wisconsin Public Service Corp. five out of 15 prizes for that month in Group 3 of the American Gas Association's nation-wide contest to stimulate the sale of modern gas ranges.

Justly proud of its salesmen's achievement the company turned this record to a practical purpose in publicizing the record set by these men in their local communities. Prominent advertising was carried in local newspapers, featuring the accomplishment, as illustrated by the full page advertisement carried in the Sheboygan press, shown at left.

The salesmen winning the awards were Edward J. Haas, Henry G. Hiebing, and Arthur C. Pausig of Sheboygan, Wis.; W. G. Vertz of Two Rivers and F. C. Tegatz of Oshkosh. It is especially noteworthy that three men from one city, Sheboygan, should take three of the 15 prizes against salesmen from all other companies competing in Group 3 throughout the United States. Furthermore these men established this record in a highly competitive market with a progressive electric utility campaigning electric ranges and water heaters.

The citizens of Sheboygan reacted very favorably to the publicity which the outcome of the contest had brought to the city, and the company received many compliments after the appearance of the full page advertisement. In the other two towns where winners resided, smaller ads were run and a news story released, which in each instance was published in full.

## Texas College Introduces Gas Engineering Course

A COURSE in natural gas engineering to be inaugurated next fall at the Texas College of Arts & Industries, Kingsville, Texas, came a step nearer accomplishment at a recent two-day meeting of the college authorities and the gas executive board in Kingsville. Committee chairmen were appointed, curriculum approved, laboratory equipment purchased. Plans call for the completion of a natural gas laboratory in the coming year.

Appointed chairmen of the following committees were Chester L. May, Dallas, vice-president and general manager of Community Natural Gas Co.—Equipment; F. Y. Hutchison, Houston, chief engineer of Houston Pipe Line Co.—Curriculum; and J. V. Strange, Houston, vice-president of United Gas Co.—Summer Employment.

Outstanding gas men of the southwest on the Advisory Board are Frank C. Smith, president of Houston Natural Gas Co.; R. H. Heard, president of the Texas Gas Utilities Co.; R. E. Wertz, president of the Amarillo Natural Gas Co.; A. D. Powell, vice-president of the San Antonio Public Service Co.; A. D. McLaughlin, president of the Pittsburgh Equitable Meter Co.; Captain A. E. Higgins, secretary of the American Gas Association's Natural Gas Department; and Committee Chairmen May, Hutchison, and Strange.

## J. D. Creveling to Head Panhandle Eastern

J. D. CREVELING, since 1919 head of the Natural Gas and Natural Gasoline department of Cities Service Co., has accepted appointment as president of the Panhandle Eastern Pipe Line Co., and leaves Cities Service to undertake his new duties effective July 1. His election as a director and president of Panhandle Eastern took place at the last meeting of the directorate.

J. D. CREVELING

Mr. Creveling is a native buckeye, being born at Mt. Vernon, Ohio, where he attended the local high school and Ohio Wesleyan University, and later the Massachusetts Institute of Technology.

His first work for a natural gas company was in 1904 in the Knox-Licking County fields of Ohio for the Logan Natural Gas Co. After graduating he worked for the Logan Natural Gas Co. and Ohio Fuel Supply Co. in Ohio, Pennsylvania, and West Virginia fields in various engineering and operating capacities in all branches of the industry until 1918. During the summer of 1918 he became construction engineer for the Empire Companies, a Cities Service Co., with headquarters at Bartlesville, Okla. On July 1, 1919 he was moved to the New York office of Cities Service Co. as head of the Natural Gas and Natural Gasoline Department, which position he held until his resignation to assume his new duties.

He was president of the Natural Gas Association of America in 1923 and is now a member of the executive committee of the American Gas Association, and a member of the Advisory Board of the United States Bureau of Mines representing the natural gas industry thereon.

■ ■

## Arkansas Co. Promotes Parker

Charles E. Parker has been appointed head of the purchasing department of the Arkansas Natural Gas Corp., succeeding L. E. Smith who resigned to accept a position in New Orleans, according to a recent announcement by D. W. Harris, vice-president and general manager of the company.

■ ■

## W. L. Larsen Promoted

Walter L. Larsen was recently named superintendent of the gas deparmtent of the Lake Superior District Power Co., Ashland, Wis., filling the post held by the late Fred Englund. Mr. Larsen formerly held the post of general gas superintendent for the company.

■ ■

## Managers Switch Posts

R. R. Shideler, for the past three years manager of Kansas Power and Light Co. at Concordia, has been appointed manager at Belleville. George Largent, manager at Belleville, fills Mr. Shidler's post at Concordia.

Looking Up TO GREATER DEPTHS AND HIGHER
TEMPERATURES Nordstrom looks years ahead

THE PERFECT APPLICATION OF A PRINCIPLE

# A PROPHECY

## LOOKING YEARS AHEAD TO GREATER VALVE NEEDS

***Oil and gas wells will be drilled four miles deep or more.***

***Gasoline will be produced by methods that will obsolete present equipment.***

***Gas will be transmitted at pressures far in excess of present standards.***

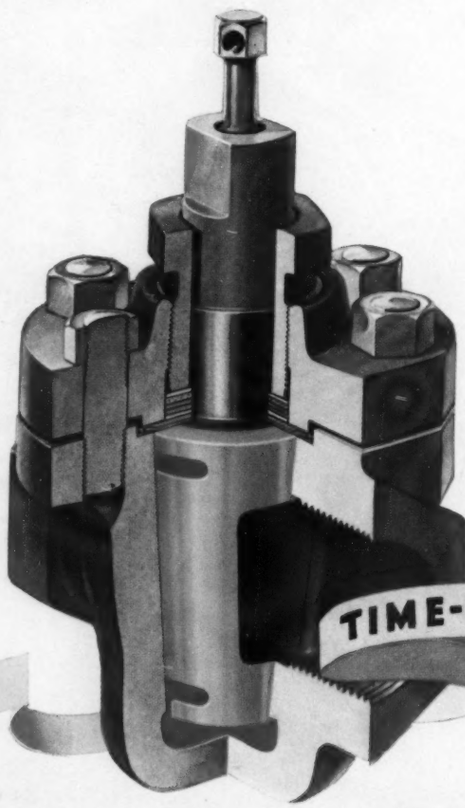
***Chemical and metallurgical progress will completely solve corrosion and erosion problems.***

NOTHING IS CONSTANT BUT CHANGE! Progress marches on. In the fields of chemistry spectacular advances continue with increased momentum. A procession of improvements marks the Gas and Refining Industries. Present day standards of drilling, viewed in comparison with those existing twenty years ago, reveal the great strides already accomplished and emphasize the certainty of continued progress.

NORDSTROM VALVE engineers look years ahead. Present-day valve requirements are met. New-day valve needs will also be met. ***For instance:*** The highest established standards of pressure are 6,000 lbs. test and 3,000 lbs. working pressure. When Industry demands 8,000 lbs. test and 4,000 lbs. working pressure we are ready to offer this higher rating. AND, when 10,000 lbs. test and 5,000 lbs. working pressure are eventually demanded, we will be ready to deliver it on a few weeks' notice.

**Only Nordstroms can meet all major valve needs.**

**MERCO NORDSTROM VALVE CO.**
*a subsidiary of*
**PITTSBURGH EQUITABLE METER CO.**
Main Offices: Pittsburgh, Penna. Branch Offices: New York City, Buffalo, Philadelphia, Columbia, Memphis, Atlanta, Chicago, Kansas City, Tulsa, Houston, Los Angeles and Oakland.



WORLD-WIDE ACCEPTANCE

TIME-PROVEN

NORDSTROM VALVES

LUBRICATED PLUG

PATENTED "SEALDPORT" LUBRICATION

## Order Community Natural, Lone Star Refund

REFUNDS to consumers of the Community Natural and Lone Star Gas Companies totaling approximately $165,000 were ordered by the Oklahoma State Corporation Commissioner to close a five-year rate controversy as a temporary order issued in 1933 for reduction of 10 cents per 1,000 feet in the rate charged consumers in 26 Oklahoma towns was made permanent without additional evidence.

Company attorney C. C. Hatchett announced that the decision would be appealed to the State Supreme Court. Pending outcome of the appeal, the $165,000 ruled excessively charged since March 9, 1933, will not be refunded.

The Oklahoma towns affected are Frederick, Durant, Hugo, Achille, Caddo, Davidson, Sulphur, Davis, Elmore City, Hastings, Hollis, Toco, Manitou, Marietta, Maysville, Mountain Park, Paoli, Pauls Valley, Purcell, Ryan, Snyder, Tipton, Walters, Waurika, Wayne, and Wynnewood.

■ ■

## Louisiana Proposes Tax On Natural Gas

RECENTLY introduced before the Legislature of the State of Louisiana was House Bill No. 284 to increase the Severance Tax on natural gas. The bill proposes to levy a 5 per cent sales tax on all gross sales of (a) all natural gas produced, sold, or transported, or used to manufacture by-products within the State; (b) all natural gas produced or sold within the State and shipped by pipe line in the State to points outside the State and then back into the State in one continuous movement. The tax is to apply to each and every person, firm, corporation, or company on each and every sale, and shall be absorbed by the seller and in no instance be passed on to the consumer. A sum of $30,000 to be deducted annually from the tax collected is to be used in enforcing the law.

■ ■

## U. G. I. Negotiates For Natural Gas Supply

Late in June United Gas Improvement Co. and Columbia Gas and Electric Corp. had negotiations under way under which U. G. I. would receive a supply of natural gas for four of its subsidiary companies in Pennsylvania, from Columbia G. and E. The four subsidiaries are Allentown-Bethlehem Gas Co., Consumers Gas Co. of Reading, Lebanon Valley Gas Co., and Harrisburg Gas Co. Contract negotiations will probably not be concluded until late in the month.

■ ■

## Graham Resigns Post

Hilton W. Graham has resigned as manager of the Fairmont, Minn. division of the Central States Electric Co., which operates the gas plant serving the city of Fairmont. E. J. Warner has been appointed Mr. Graham's successor. Mr. Warner for the past nine years has been connected with the company's Cedar Rapids office in the commercial department. Mr. Graham will return to his former home in Kansas City.

# City Officials Proclaim "Natural Gas Week" in Austin, Texas

By S. M. APPERSON
Commercial Manager of The Texas Public Service Company

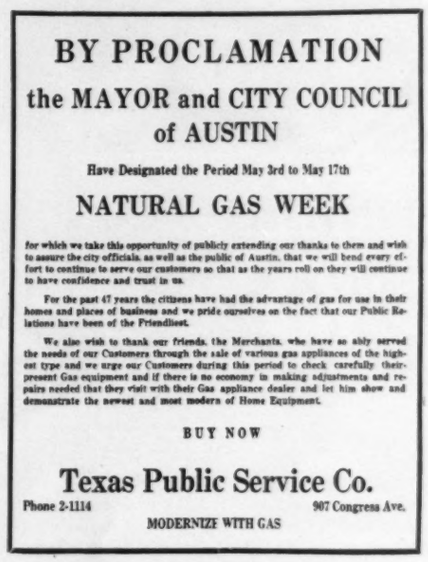
NOT long ago in the eternal search for a merchandising idea, the writer wandered into the office of the American-Statesman, Austin daily paper, and began aimlessly turning the pages of an advertising service book. Page after page revealed not a single idea, but one thing in the book was most noticeable—the innumerable "weeks" and "days" being celebrated. Suddenly it occurred to me . . . why not a "Natural Gas Week" with a quadruple tie-in of the Mayor and City Council, the local newspaper, the gas appliance dealers of Austin and the Texas Public Service Company.

The whole idea hinged, of course, on the willingness of the Mayor, Honorable Tom Miller, and the City Council to proclaim "Natural Gas Week". With Mr. A. T. Knies, Vice-President of the Texas Public Service Company, approaching his twenty-fifth year as head of the gas company in Austin, and gas approaching its fiftieth year in the City, the Mayor agreed to the plan, and thought it an excellent idea, and requested that a Proclamation be presented at the next City Council meeting which was two days later.

The "Gas Week" Proclamation was unanimously passed by the Council and read into the minutes of the meeting. A Texas Centennial Sombrero was presented to each official of the City as a token of thanks.

The next step was to approach the newspaper in regard to advertising. We agreed to stand one half the cost on a page with the gas appliance dealers paying the balance. The writer went the rounds of the merchants with an advertising solicitor, and when we had called on about one-third of the dealers the page was sold, so we threw down the bars and said "Come on." It wound up by our having two and one-half pages. One of Austin's largest department stores that has never been in on any co-operative advertising before came in for a nice advertisement. We agreed not to advertise our merchandise, but only gas, and to encourage the consumer to see his dealer. Our show windows were decorated with backgrounds telling of the "Natural Gas Weeks," May 3rd to May 17th, and listing the dealers that were co-operating. During the two weeks our sales were greater than any like period for years, and the merchants were well satisfied with the results.

We are indeed proud that our public relations are such that the City Officials could go on record commending our utility service.



BY PROCLAMATION

the MAYOR and CITY COUNCIL of AUSTIN

Have Designated the Period May 3rd to May 17th

NATURAL GAS WEEK

for which we take this opportunity of publicly extending our thanks to them and wish to assure the city officials, as well as the public of Austin, that we will bend every effort to continue to serve our customers so that as the years roll on they will continue to have confidence and trust in us.

For the past 47 years the citizens have had the advantage of gas for use in their homes and places of business and we pride ourselves on the fact that our Public Relations have been of the Friendliest.

We also wish to thank our friends, the Merchants, who have so ably served the needs of our Customers through the sale of various gas appliances of the highest type and we urge our Customers during this period to check carefully their present Gas equipment and if there is no economy in making adjustments and repairs needed that they visit with their Gas appliance dealer and let him show and demonstrate the newest and most modern of Home Equipment.

BUY NOW

Texas Public Service Co.

Phone 2-1114 907 Congress Ave.

MODERNIZE WITH GAS

**Texas Public Service featured Natural Gas Week in local advertising.**

# Summer Heating Drive Under Way

PACIFIC Gas and Electric Co.'s annual Summer Gas Heating Campaign, starting May 29 and extending to August 27, is swinging into full stride. The summer campaign has proved an outstanding success in P. G. and E. territory, benefiting the customer by giving him a reduced price, easy terms, and prompt installation; and the contractor-dealer by equalizing his installation work over the entire year.

Special inducements are offered the customer buying heating equipment during the summer. This year the campaign offers a 10 per cent discount on the installed price of all types of domestic gas heating appliances, including domestic conversion burners. In addition, the customer is not billed for the equipment until October 1st.

Liberal terms are being featured, with emphasis on F. H. A. financing of central furnace, boiler, and floor furnace installations. Or if the customer prefers, he may pay for the equipment either to the dealer or the company, under the deferred payment plan.

The Pacific Gas and Electric Co. is supporting this campaign with heavy advertising, featuring the campaign offer and also the new gas rate reduction. The company also is offering to cooperate with dealers to the extent of paying one-third the cost of their advertising on domestic heating appliances, the advertising to be limited to daily and weekly newspapers in which the company's regular advertising is carried. The same offer is being extended to dealers for automatic gas water heater advertising.

# Mississippi Co.'s Happiness Convention Shows 21,380 Two-Month Attendance

FEATURING a widely attended cooking school and colorful displays of modern gas appliances, the "1936 Convention of Happiness" sponsored during April, May and June by the Mississippi Power & Light Co. had at the close of its second month attracted an attendance of 21,380 persons in 32 towns and cities throughout the area served by the company. Last year a similar three-months event drew 26,439 spectators, and with attendance figures for June yet to be compiled, it is expected that this year's convention will far surpass the 1935 event.

A contest feature in connection with the convention series was a "non-political election" race between Old Man Quota and Happy Homer, personifying "sales above quota." With sales representing votes, reports from the second month of the convention already show Happy Homer leading Old Man Quota by a 20 per cent margin.

Tying in with the Convention of Happiness were a wide variety of promotional activities. Throughout the state dealer merchandising displays attracted large crowds. In some cities dealers entered attractive girls in a popularity contest for the title of "Miss Happiness of 1936." Great interest was evidenced by the public in the latest "election" returns between Old Man Quota and Happy Homer. As an inducement to dealers and salesmen the Mississippi Power & Light Co. offered cash prizes to those contributing the most sales and therefore the most votes toward the election of Happy Homer.

# Nude Salesmen Make Quota, Get Dress

SUCCESS to a certain type of female dancer lies in the amount of clothes she can eliminate . . . . but to the 70 salesmen of the Minneapolis Gas Co., entered in the recently concluded "Bare Facts" sales campaign, it meant just the opposite.

To make certain that his salesmen started the contest with equal opportunity, Sales-manager "Pat" Boyer stripped his crew naked, told them that not until each man had sold his quota in the $100,000 load-building campaign would he again be fully clothed.

Each salesman was realistically and handsomely represented by a nude mannikin identified by a facial photograph. As the campaign progressed, and a man sold one-twentieth of his quota, he gradually dressed his mannikin by earning one of the twenty garments which would make him at the campaign's close a proverbially well dressed man. Not to be "outstripped" by their fellows (see cut), many of the entrants made the opening gala affair of the campaign a boisterous and jovial occasion.

Warned that each man would have to attend the banquet at the end of the campaign clad only in those clothes which he had earned, the salesmen went to work in earnest, surpassed the company's highest quota of $100,000 by $23,000, appeared at the final dinner for the most part fully dressed.

Material and contest idea for the campaign were supplied by the Hahn-Rodenburg Co., Springfield, Ill., who have copyright and patent protection. Data and pictures on the unique drive were furnished *GAS* through the courtesy of R. S. Ellsworth of the company's advertising department.

■ ■

## Hulcy Named Lone Star Corp. Executive Vice-President

D. A. HULCY was made executive vice-president of the Lone Star Gas Corp. at the recent annual meeting of the stockholders. Mr. Hulcy, former vice-president and director of the corporation, became affiliated with the system in 1920 as an accounting executive. In 1922 he was elevated to the post of chief clerk of the production section of the general accounting department of Lone Star, holding that position until 1928, when he became assistant comptroller in direct charge of all accounting matters for all the underlying companies of the corporation. During the latter part of 1929 Mr. Hulcy was appointed assistant to the president of the Lone Star Gas Co., and in 1935 was named vice-president and director of the Lone Star Corp., holding that position until his recent appointment to the executive vice-president's post.

D. A. HULCY

■ ■

## B. C. Electric Sponsors Symphony Concerts

Enthusiastic public reception during the past two seasons of the "Symphonies Under the Cedars", sponsored by the B. C. Electric Railway Co., at Vancouver, B. C., has prompted President W. G. Murrin to announce that a series of five concerts will again be offered this summer, the first concert being given June 21st.

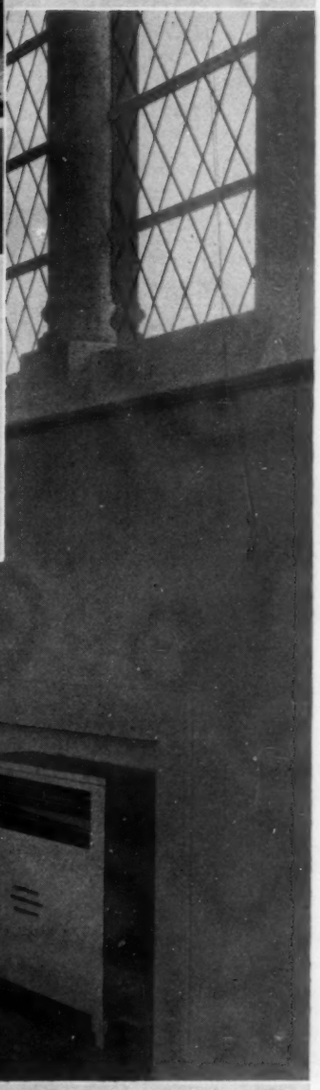
The programs are given every other Sunday afternoon in Stanley Park by the Vancouver Symphony orchestra under the direction of Allard de Ridder.

■ ■

## Republic Gas Corp. Moves To Corpus Christi

The Republic Gas Corp. last month moved its main offices from Houston to Corpus Christi, Texas, leasing the 11th floor of the Nixon Building. During the last nine months, according to Alfred Hurlburt, operating vice-president, the company has made extensive investments in South Texas oil and gas developments, having leased much acreage in the Corpus Christi territory.

Payne Modern Consoles blend with the interior decorating schemes. Illustration shows installation of Payne Consoles to heat auditorium at Marymount School, in Westwood Hills, California, the heaters being finished to blend with wall coloring.



# A Big Factor in YOUR SUMMER CAMPAIGN

## PAYNE CONTROLLED GAS HEATING!

THE NEW PAYNE CONSOLE HEATER has added beauty and the proper protection for its fine finish. Unsurpassed in efficiency in the use of GAS. . . . Equipped with the most modern device for controlling temperature. . . . Employing a truly scientific principle of air circulation, the Payne Console solves the problem of the selection of a "best seller".

Give your customer a beautiful appliance, at a fair price, and at the same time assure the permanent good will and load building that the sale of a gas burning appliance should produce.

An entirely NEW finish for Payne Modern Consoles. This beautifully grained walnut or mahogany finish will help you boost your circulator sales beyond your greatest expectations.

We'll tell you more about the features of Payne Modern Console Heaters. . . . Write NOW, before the Summer Campaign is in full swing.

**PAYNE FURNACE & SUPPLY COMPANY**

BEVERLY HILLS · CALIFORNIA

# San Diego Co. Pushes Water Heaters

SAN DIEGO (Calif.) Consolidated Gas and Electric Co. recently concluded a one-month automatic gas water heater campaign conducted through the Gas Appliance Dealers Association of San Diego county, which sold 361 units that qualified under the terms of the contest for a special discount. The total number of automatic gas water heaters sold during the campaign period was approximately 550. In order for the purchaser to be eligible for the discount the automatic heater had to replace a manually operated one in actual use, had to be A.G.A. approved, have actual tank capacity of not less than 20 gallons, have safety pilot shut-off, and the net uninstalled price had to be not less than $35.

Sorry I'M LATE...
She may not tap her foot in anger when you arrive late to take her to the show . . . but won't your face be red as you try to explain your tardiness on some pretext or another . . . WHEN DOWN IN YOUR HEART you know that old-fashioned water heater was to blame.
Of course you want to "come clean" with HER . . . but you also want to come quick.
I WAS UNAVOIDABLY DETAINED
You can take a good deal of unpleasantness out of life by installing one of the new automatic gas water heaters. Think of it, hot water any hour of day or night in whatever quantities you desire. Always the same temperature—always economical, too.
SEE YOUR DEALER for special inducements on the purchase of automatic water heaters for a limited period beginning April 20th.
GAS APPLIANCE ASSOCIATION OF SAN DIEGO COUNTY

**"I was unavoidably detained," was the key phrase in advertising copy supporting the San Diego water heater drive.**

The campaign featured a 20 per cent discount on automatic water heaters sold during the campaign, 60 per cent of which was borne by the company. When a sale was completed, the dealer notified the company and an inspector was sent to the home of the purchaser to check on whether the old heater was eligible for the allowance, in which case he attached a numbered tag to it. The dealer then removed the old heater, delivered it to the shop of the company and received the numbered stub of the tag as a receipt. Within 24 hours after the heater was delivered the dealer presented the stub to the proper department at the company and received his rebate.

The campaign was backed by a series of radio broadcasts and an advertising campaign in the newspapers.

The company's water heater campaigns of the last few years have resulted in a steady trend in San Diego County for automatic water heaters to outsell the manual type, until the ratio is now about three to one.

■ ■

## P. C. G. A. Convention Plans Laid at Meeting

PLANS for staging the 43rd annual convention of the Pacific Coast Gas Association at San Francisco, August 25-27, were formulated at a General Convention Committee meeting held at the Fairmont Hotel, June 12. The Fairmont will be convention headquarters.

Present at the meeting were H. M. Crawford, president of the Association; Mrs. H. M. Crawford, Convention Hostess; Clifford Johnstone, managing director of the Association; and Henry Bostwick, general chairman. The following committee chairmen were also present: C. B. Babcock, entertainment; E. G. McCann, program; Frank Talcott, reception and attendance; E. C. Wood, transportation; Jean Frickelton, publicity; Wayne Clark, registration; W. A. Worthington, hotel accommodations; A. C. Joy, convention newspaper; B. W. Reynolds, banquet; and F. J. Southerland, properties. E. J. Hinchey, golf tournament chairman, was unable to attend. Also attending the meeting were Alfred Y. Barson, resident manager of the Fairmont Hotel, and Jay Jenkins, publisher of *GAS*.

■ ■

## Penote, Trenching Machine Inventor, Dies

AUGUSTUS J. PENOTE, 55, president and founder of The Cleveland Trencher Co. and The A. J. Penote Co., died may 9th at his home in Cleveland, Ohio, suddenly of an acute heart attack.

Mr. Penote was born in Buffalo, New York, but had resided in Cleveland for the past thirty-eight years. He was nationally known throughout the public utility field as a contractor, manufacturer and inventor. Among his many inventions was the full-crawler type trenching machine, of compact design for city work, which he constructed originally for his own use, subsequently founding the Cleveland Trencher Co. for its manufacture.

As a contractor, Mr. Penote installed underground cable and conduit systems, gas lines, etc., in many cities throughout the Middle West.

■ ■

## North Shore Gas Co.'s Salesmen Tour Plant

To give the salesmen of its new business department a more thorough selling knowledge of gas manufacture and gas appliances, the North Shore Gas Co., Waukegan, Ill., recently conducted a "behind the scenes" tour through its Waukegan plant. E. H. Wachs, assistant manager, and George C. Klopf, commercial manager, supplemented the tour with running descriptions of the manufacturing processes and machinery.

## Stevens Institute Confers D. E. on A. B. Macbeth

ALEXANDER B. MACBETH, president of the Southern California Gas Co., was recently honored by his alma mater, the Stevens Institute of Technology, New Jersey, while on a trip east. Mr. Macbeth was presented with an honorary degree, Doctor of Engineering. He was also recently appointed a Trustee of the Institute.

A. B. MACBETH

In recommending Mr. Macbeth for the degree, President Harvey N. Davis pointed out that Mr. Macbeth, a graduate of the class of '97, had distinguished himself in the engineering field. "Since the days of his cadetship in his profession, he has advanced westward, from Georgia to Kansas, from Kansas to California, establishing and fortifying the outposts of a then new and always vital industry of public service; an alumnus who has presided over the local and national councils of his engineering associates, and whom we now welcome home."

Mr. Macbeth is a past president of the American Gas Association and the Natural Gas Association of America, and was a vice-president of the American Petroleum Insitute.

■ ■

## United Gas Plans $2,500,000 Rodessa Field Project

A $2,500,000 project recently launched by the United Gas Public Service Co. will include a compressor plant in the Rodessa field of North Caddo parish, La., the construction of a new 25-mile 16-inch welded pipe line from the field, to join its main trunk line, and the enlargement of the Myrtis absorption plant. Work on clearing the site and laying the foundation for the compressor plant was started in May.

The construction of the new 25-mile pipe line will give the company three outlets from the Rodessa field. The second line from this district was completed only last summer.

■ ■

## Sales-Cooks Eat Turkey

As a reward for their aptitude as cooks, 10 salesmen and Supervisor Frank E. Anderson of the Peoples Gas Light and Coke Co., Chicago, Ill., were treated to a turkey dinner cooked by Vice-President F. X. Mettenet under the supervision of Elizabeth Lynahan of the company's home service department. The rewarded diners were members of a team of outside salesmen who had shown the most interest in discussion and best results in the preparation of food in attending the company's classes in the study of the modern gas range and cooking as an aid to appliance selling.

■ ■

## Columbia Executive Dies

Joseph Warren Reeser, since 1909 superintendent of distribution for the Charleston, W. Va., group of the Columbia System, died recently at his home in Huntington, W. Va., at the age of 66.

# Give Your Heaters Control That CLICKS with KLIXON

## All Gas Thermostats

YOU get accurate control with Klixon All-Gas Thermostats. For these thermostats click on the dot. They are operated by the Spencer disc—a small thermostatic disc that snaps into convex or concave shape, turning on or off bleeder and main valves at predetermined temperatures. This disc makes the heater automatic. It provides accurate snap-action room temperature control—control that will **sell** your heaters.

Klixon Thermostats are easy to install. You can mount them on a wall, for remote control, or directly on the heater inlet. And, in addition, your own organization can service them without difficulty. For they are **gas-actuated**—no electric wiring of any kind is used.

All Klixon thermostats are small, compact and attractive. They are simple in construction and low in cost.

---

For complete and safe automatic operation, Spencer provides Automatic Pilot Shut-Off Valves to be used with these new room thermostats. These valves give absolute safety in lighting and operation by providing:

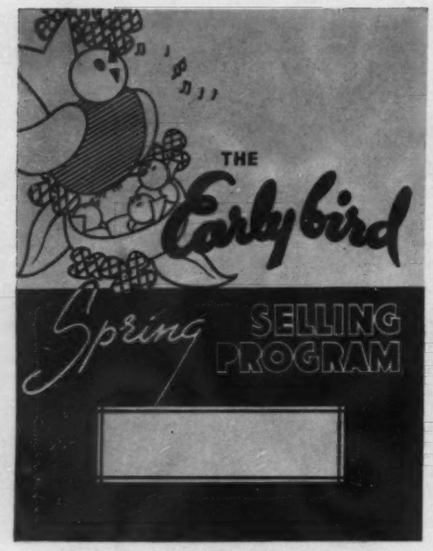
1. Full safety regardless of sequence in lighting.
2. Safe failure in case thermal element is damaged.
3. Shut off of all gas including pilot on ignition failure.

KLIXON

TRADE MARK REG. U.S. PAT. OFF.

SPENCER THERMOSTAT CO.

Attleboro, Massachusetts, U. S. A.




**Front cover of "Early Bird" prospectus.**

## "Early Bird" Salesmen Catch Their Quota of "Worms"

UNIQUE among the many spring sales campaigns of U. S. major gas companies was the "Early Bird Load Building Campaign" of the Wisconsin Power and Light Co., active from March 16 to May 25. Designated as "Early Birds" were the salesmen and general employees of the company, while the quotas on the various appliances sold by the company were the "Worms."

That the employees, both sales and general, caught the spirit of the campaign, pruned their feathers, caught napping the wary quotas is evident from the final outcome of the campaign in which 11 out of 14 districts surpassed the designated quota. Leading district of the company, Lake Geneva, took the top prize, selling $16,353.54 worth of appliances and ending the campaign 276 per cent over quota.

In the gas activities of the company, final sales results showed gas ranges (replaced) 187, gas ranges (new) 122, gas storage water heaters 69, and gas refrigerators 58.

In the campaign employees were divided into 11 different groups according to their positions in the company, prizes being awarded the leaders in each group.

■ ■

## Michigan Associations Meet in July

PLANS have been completed for the joint convention of the Michigan Gas Association and the Michigan Electric Light Association to be held at the Grand Hotel, Mackinac Island, Michigan, July 6, 7, and 8, according to A. G. Schroeder, secretary of the Michigan Gas Association. On the evening of July 7, convention members will be entertained at a supper dance and floor show.

Opening the Gas Association program on July 7 will be the President's address by D. H. Frazier, Jr. of the Battle Creek Gas Co., Battle Creek, Mich., followed by reports on the Gas Fellowship at the University of Michigan by D. W. Hayes, Chairman of the Technical committee and Prof. Alfred H. White, Director of Research Work. Alexander Forward, A.G.A. Managing Director, will bring a message from the American Gas Association while the activities of the Association of Gas Appliance and Equipment Manufacturers will be reported by John A. Fry of Detroit. The National Gas Advertising program will be presented by Herman Russell, National Chairman.

Safety will be stressed at the joint meeting of the Gas and Electric Associations on July 6 in the addresses of C. B. Boulet of the Wisconsin Public Service Corp., Milwaukee and R. B. Douglas of the Detroit Edison Co.

■ ■

## Linking Distribution Areas To Milpitas Line

CONSTRUCTION of the first gas main to cross Golden Gate Park in San Francisco is now under way, according to R. S. Fuller of the Pacific Gas and Electric Co. Paralleling the new high speed highway crossing from Nineteenth Avenue on the south to Twenty-fourth Avenue on the north, the line will facilitate distribution of gas in the Sunset and Richmond districts. It is planned eventually to extend this 16-inch high pressure main to tie in with the recently completed 22-inch main from Milpitas. The present extension is to cost $17,000.

Plans also have been approved and $75,000 expenditure authorized for another link in the distribution system in this area. The work is to start soon on a 16-inch high pressure main on Nineteenth Avenue between Ocean Avenue and Lincoln Way.

When these extensions are completed, Sunset and Richmond districts will be served direct from the Milpitas line. Under the present system of lines which skirt the park, gas for these districts must first be taken to the company's downtown plants, and distributed from there.

Reprinted from the San Francisco Examiner.

**"What'll I say now? I just bawled out the gas company and they say I'm perfectly right!"**

## Southern Union Sales Drive Has Travel Theme

AN UNIQUE contest, known as the Centennial Vacation Contest, starting in June and continuing through July was offered to the employees of the Southern Union Gas Co., Dallas, Texas. Built about excitement of the Texas Centennial, the contest takes the form of a trip, so many "miles" at 2c per mile being awarded for the sale of gas appliances or new customers by any company employe other than a regular salesman or a district manager. Thus, for the sale of a new central furnace, an employee would receive a credit of 20 "miles" towards his "trip." For selling a new gas meter, he would receive 50 "miles" or $1.00, and so on through all the appliances sold by the company.

At the culmination of the 60-day contest, three grand prizes will be awarded to the three employees throughout the system who traveled the greatest distance in the contest. These three prizes will be an extra vacation week with pay, and a trip to the Texas Centennial, all expenses paid. In addition to these grand prizes, other prizes both for individuals and districts will be offered throughout the contest.

■ ■

## New Slate Announced for Pacific Coast Gas Assn.

RECOMMENDATIONS for next year's officers and directors of the Pacific Coast Gas Association, have now been submitted by the nominating committee, according to Clifford Johnstone, managing director of the Association. On the list are the following:

For President: J. F. Pollard, Seattle Gas Co.

For Vice-President: N. R. McKee, Southern Counties Gas Co.

For Treasurer: D. G. Martin, Pacific Gas and Electric Co.

For Directors: W. J. Bailey, Day & Night Water Heater Co., Ltd.; H. L. Farrar, Coast Counties Gas & Electric Co.; Clarence Graham, Jas. Graham Mfg. Co.; R. A. Hornby, Pacific Lighting Corp.

Serving on the nominating committee were Geo. P. Egleston, chairman; H. M. Thomas, F. S. Wade, E. L. Payne, and D. C. Ray.

■ ■

## New Bristol Controller

Th Bristol Co., Waterbury, Conn., has just published Bulletin No. 444 which describes the new Model 90 Pneumatic Type Controller for temperature, liquid level, and pressure. In this bulletin the principle of operation is outlined and other information concerning application of the controllers, with drilling dimensions, etc., is given.

■ ■

## Employees Receive Awards

At a ceremony marking the close of 9 years of educational activities by the Employees Association of the Los Angeles Gas and Electric Corp., nearly 1000 certificates of completion were presented on June 12 to the employees enrolled in the school, according to Warren W. King, chairman of the educational committee.

# *The* PUBLIC *and* THE UTILITY BOTH PROFIT

## from the advantages of *non-rust*

# EVERDUR TANKS

**STRENGTHENED COPPER**

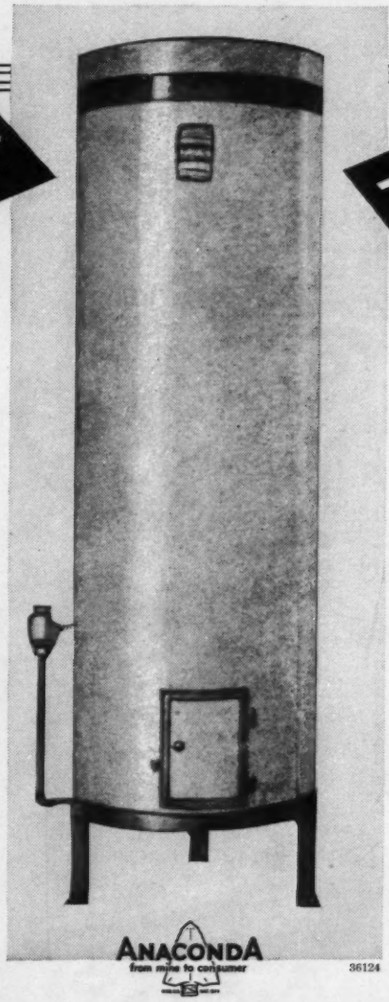
Everdur Metal is copper...strengthened by the addition of silicon and other elements. It is moderately priced, strong and immune to rust. These are the basic reasons why Everdur tanks are more advantageous both for the utility and the public.

**THE UTILITY *Benefits*-**

In steadier gas consumption, because tank rust and rust-repairs never interfere with efficient heater operation. Costly service calls are reduced . . . customer-satisfaction increased. And since Everdur tanks can never fail because of rust, they provide the utility with *a sound basis for longer-term payment plans.*

•

THE AMERICAN BRASS CO.
General Offices: Waterbury, Connecticut
*Offices and Agencies in Principal Cities*
In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.




**THE PUBLIC *Benefits*-**

In the assurance of plenty of clean, rust-free hot water indefinitely... in the elimination of all tank repair and replacement expense caused by rust ...in the reliable service which, over a period of time, more than returns the original extra cost.

•

Twenty-four leading manufacturers of automatic gas storage water heaters now standardize on welded Everdur tanks for rust-proof models.

EVERDUR METAL
"Everdur" is a registered trade-mark identifying products of The American Brass Company made from alloys of copper, silicon and other elements.

# EVERDUR METAL FOR TANKS

**A COPPER ALLOY WITH THE STRENGTH OF STEEL**

## Oklahoma Natural Managers Receive Promotions

J. C. BORDERS has been appointed El Reno manager of the Oklahoma Natural Gas Co., succeeding C. M. Van Slyke, who has been transferred to Iola, Kansas as district manager of the company's Kansas properties, according to Thomas H. Sterling, Oklahoma City district manager.

In his new capacity Mr. Van Slyke will have charge of the properties at Iola and Erie, Kansas, the industrial gas service of Chanute, Kansas, and the 400 miles of transmission lines located in southeastern Kansas, serving Independence, Coffyville, and Cherryvale.

Mr. Borders who has been associated with the company since 1923 was connected with the accounting department in Okmulgee until 1931, then being transferred to the Tulsa district where for three years he served as assistant chief clerk. Prior to his El Reno appointment, he was assistant manager and chief clerk of the company's Enid Office.

■ ■

## F. L. Blanchard, Cities Service Ad Man, Dies

FRANK LEROY BLANCHARD, former head of the Advertising and News Department of the Cities Service Co., New York, died recently in his Brooklyn home at the age of 77. Mr. Blanchard held the advertising post with Cities Service Co. from 1922 to his retirement in 1932.

Beginning his career as reporter for the New York Tribune and the City Press Association, Mr. Blanchard was successively telegraph editor of the Commercial Advertiser; editor and publisher of the New Britain, Conn., Herald; business manager of Electric Power; assistant editor of the Evening Telegram; on the staff of Printers' Ink; and from 1911 through 1916 and in 1921 editor of Editor & Publisher. He was a former president of the Advertising Club in New York.

■ ■

## So. Calif. Gas Co. Constructs New Yard Building

The Southern California Gas Co. announces that construction was started about July 1 on a new yard building at its distribution and plant headquarters at 9th and Santa Fe Ave., Los Angeles. The building, of plastered brick and galvanized iron construction, will cover approximately 6100 square feet and will be used to house the yard office, salvage materials and equipment, and miscellaneous yard materials.

Also work will begin soon on the paving of 80,000 square feet of yard space. Asphaltic concrete, decomposed granite, and oil will be used.

■ ■

## All-Purpose Water Heater

The water heater of one customer of the Southern Union Gas Co., Dallas, Texas, supplies him not only with hot water but also with boiled eggs and fried chicken. Reason: the customer has devised a "skirt" addition to his heater, using it for a baby chick brooder.


The New BARBER-GREENE 64-B Ditcher

**Travels to job on small trailer.**
**B-G Backfiller Attachment Optional**

Your own requirements will show you the many places where such a small, but deep digging ditcher will be profitable.

This new Ditcher has all the Standard Barber-Greene Features including: Self Cleaning Buckets, Automatic Overload Release, Full Crawler Mounting, the famous B-G Vertical Boom, and many others.

Write for complete information, there is no obligation.

36-23

Standardized Material Handling Machines

BARBER GREENE

715 West Park Ave.
Aurora, Illinois


## "Opportunity Parade" Mid-Year Dealer Presentation

The "1936 Appliance Opportunity Parade" is being presented to dealers and their salespeople by Pacific Gas and Electric Co. at a series of meetings throughout all the divisions of the natural gas territory in the system. At this series of meetings opportunities for the sale of appliances are pointed out to the dealers in a straight business presentation, without any attempt at dramatization.

This mid-year conference brings out the fact that if the pace set during the first few months of the year can be maintained, 1936 appliance sales should total approximately 50 per cent more than 1935 sales.

■ ■

## Apache Gas Co. Official Resigns Post

J. A. WARD, president of the Apache Gas Co., Perry, Okla., last month announced the resignation of F. G. McIntyre as vice-president and general manager of the company. Mr. McIntyre has been absent from duty for several weeks due to failing health. Prior to his affiliation with the Apache Co., Mr. McIntyre was connected with the Continental Oil Co.

Mr. Ward further announced the appointment of Keith McQuiston, for several years cashier of the company, as acting manager. Besides serving Perry, the company also owns the distribution systems at Apache and Marshall.

■ ■

## Boston Gas Co. Sells 100 House Heating Units

A total of 100 sales of new gas heating installations was the result of a 12-weeks, intensive drive under the leadership of D. S. Reynolds of the house heating sales department of the Boston Consolidated Gas Co., Boston, Mass. The sales represented an estimated annual load of 55,700,000 cu. ft. for the company. Regular gas-designed equipment was sold in 52 cases and conversion equipment in 48. Salesmen were awarded bonuses and given a choice of sales districts, according to their standing at the close of the campaign.

■ ■

## Sacramento Betterments

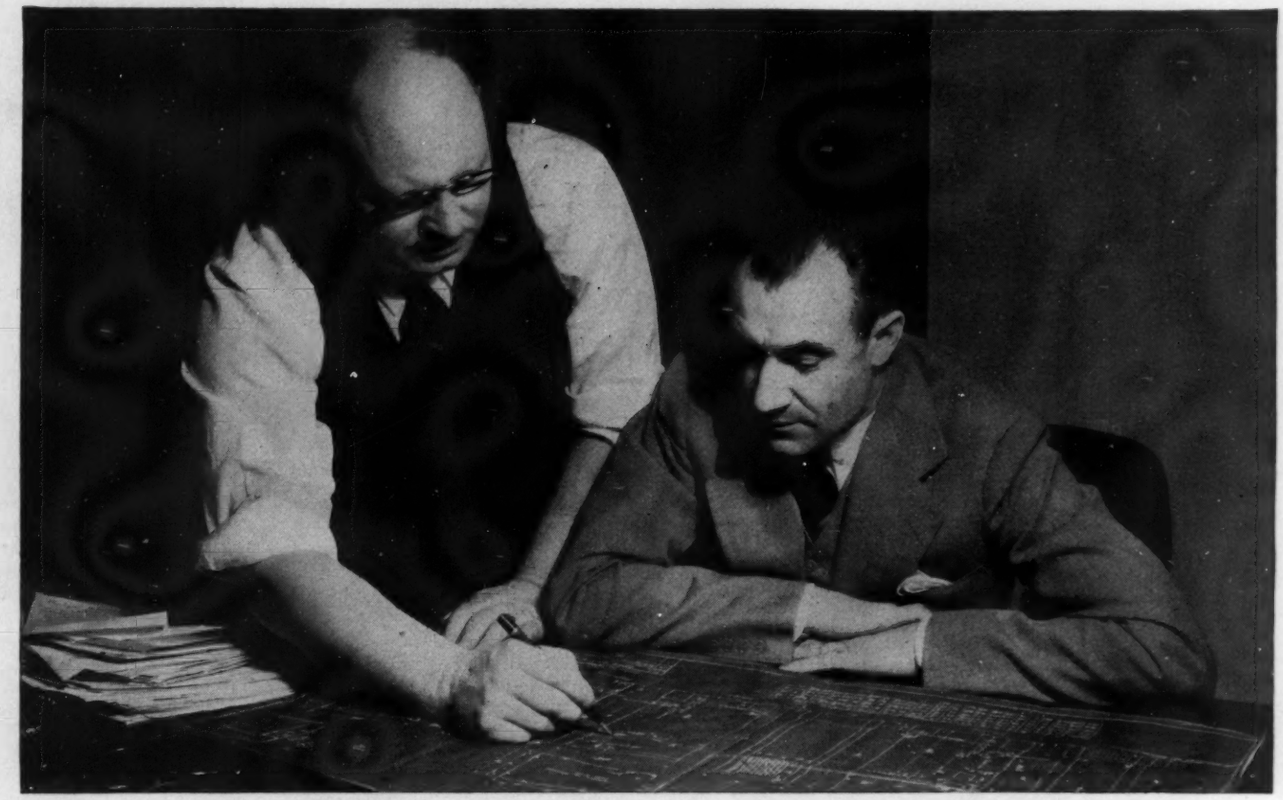
Work is to begin soon on extensions and improvements to the Pacific Gas and Electric Co.'s natural gas distribution system in Sacramento. It is expected that these improvements, which are to be made at a cost of $78,000, will be completed by autumn.

In order to provide an adequate future supply of gas for the east side of Sacramento, about 2½ miles of 16-inch steel pipeline is to be laid. To avoid unnecessary tearing up of busy thoroughfares the lines are to be routed along alleys wherever possible.

■ ■

## Wilson Serves Co. 40 Years

With the presentation of a gold badge signifying 40 years of active service, T. B. Wilson, president of the Louisville Gas & Electric Co., at a dinner in his honor was recently initiated into the company's Forty-year Club.



*E. A. Jones, Chief Engineer, L. J. Mueller Furnace Co., Milwaukee, points out a few vital facts about heating and air conditioning plans to President Harold Mueller.*

# GOOD FROM THE BLUE-PRINT UP

"MISUNDERSTANDINGS are caused by not having understandings in the beginning." That's a maxim my father taught me when I still had to stand on tiptoes to reach the doorknob. It's true in the building of furnaces and boilers, just as it is true in building business and social relationships with human beings.

Long ago my father and his father before him practiced the policy of starting at the drafting board to build good furnaces and boilers. And I have made it a point to follow the pattern which they so wisely cut.

Some people think I lean over backwards in insisting that quality begin at the blue-print—but fortunately Ed Jones, our Chief Engineer, is a stickler for precision, just as I am. You have no idea how vital this thoroughness has been during the days of pioneering automatic heat and air conditioning.

There has been such a lot of confusion and so much hysteria in the field of air conditioning that our policy of "good from the blue-print up" has proved to be a fine stabilizing influence. It has kept us out of the stampede of the inexperienced and has helped to augment our reputation for dependability in this vast new automatic heat and air conditioing market.

You have my personal assurance that you can buy, sell and recommend Mueller products with confidence.

Remember that Mueller makes the most complete line of heating equipment in the industry . . . newly styled Climator Air Conditioning Equipment and Gas Era Furnaces and Boilers as well as the great new Muelleraire direct-fired forced air unit heater for stores and commercial installations. . . . so you can rely on impartial advice. Drop me a line and I will send you our new catalog G-7.

H. J. Mueller

PRESIDENT

**New Mueller Gas Era Boiler**

Adaptable to steam, hot water or vapor heating. The new Series "A" (54 inches high and 28 inches deep) are ideally suited to small home heating. They are also adaptable to any system of heating or air conditioning employing radiation, convectors, pipe coils, unit heaters or blast heating surfaces. Go after this profitable gas load. Get all the facts about these remarkable new Mueller Boilers. Write at once.

**MUELLER-MILWAUKEE**

# MEASUREMENT and CONTROL

## Southern California Gas Co.'s Central Gas Measurement and Control Station

By ELTING HENDERSON

**Assistant General Superintendent of Distribution and Transmission, Southern California Gas Company**

THE Southern California Gas Co. recently placed in operation at its Santa Fe Avenue plant in Los Angeles, a central gas measurement and control station of modern and novel design.

Previous to the completion of the new installation, the gas dispatching headquarters for the company's system, while located at the same plant, was some distance from the point of actual pressure and volume control for the Los Angeles metropolitan area. This arrangement was inconvenient because the dispatchers received only periodic reports of conditions in the Los Angeles district and the men who operated the controls by hand were required to maintain a constant watch over pressures in the lines feeding the city's network of mains.

ELTING HENDERSON

At the time the old system was instituted, the bulk of the gas handled was manufactured gas and the volumes could be estimated with sufficient accuracy on the basis of holder readings and gas generator capacities. Later, when the supply of natural gas was increased and a mixture of manufactured and natural gas was being sent out, the gas was measured by orifice meter to insure the proper proportionment for distribution.

As the business continued to expand and straight natural gas completely displaced mixed gas, there developed need for more modern methods of measuring and controlling the large volumes entering and leaving the plant. The plan ultimately agreed upon provides the following advantages:

The chief gas dispatcher is located at the new station, which is the control headquarters for the Los Angeles metropolitan area as well as for the entire system. This arrangement coordinates the efforts of the dispatching staff and those who perform the operations controlling the flow of gas to and from the central station. Pressures on each of the main distribution trunk lines, as well as accurate measurements of gas delivered or received, are obtained continuously by the dispatcher instead of hourly as before.

Gas can be taken from the transmission lines and delivered into the distribution system or stored in holders. Likewise, it may be removed from storage and distribution as needed. These and all other necessary operations can be made by the operator from the new control room. In addition, small sampling lines are connected with each of the three transmission lines carrying natural gas from different sources. These small pipes carry the samples to a gas testing laboratory in the building for periodic checking of gravities and heating values.

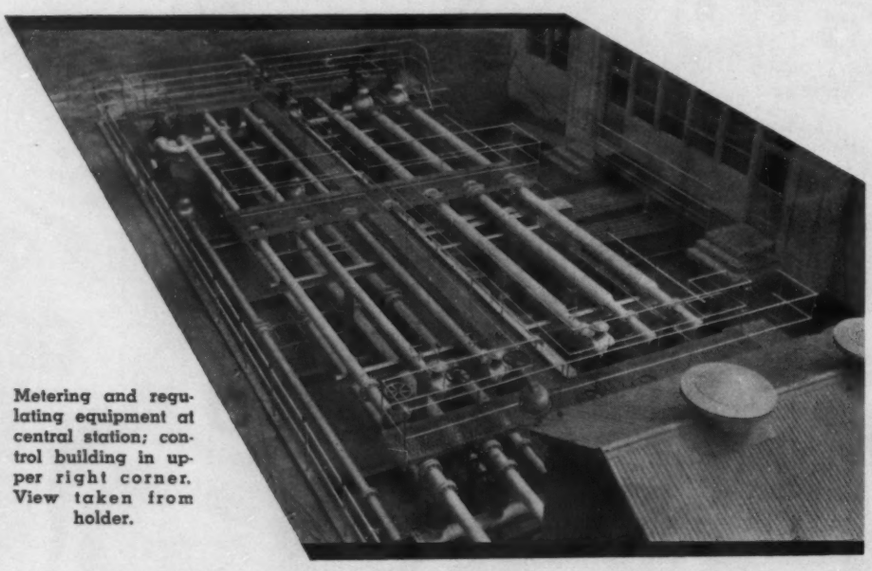
During the construction period, which extended over the peak season, it was necessary to carry on the routine operations. Temporary by-passes and headers were therefore installed and the work was completed without mishap or interruption of service to the company's customers during the re-arrangement of the existing set-up and addition of the new facilities.

The rather limited space available for the set-up was responsible for the novel arrangement of the 14 metering tubes. Seven are placed on piers in a reinforced concrete pit approximately 6 feet in depth and the balance are suspended above them on supporting bents constructed of 6-inch "H" section columns and beams. The 12-inch diameter headers are fitted with 8-inch welded spuds and lubricated plug cocks. Although some of the tubes are larger than 8 inches in diameter, that size was standardized upon for valves and fittings to facilitate the making of any changes that might be found advisable in the future. Spools are also installed in the meter runs for the same reason. Loose ring flanges and factory turns are used throughout. Gate valves are installed at the outlet of each tube beyond the headers so that the station may be manually operated in an emergency.

Electric welding was used throughout and all outside piping was given a coat of azure blue aluminum. The valves and fittings are painted black.

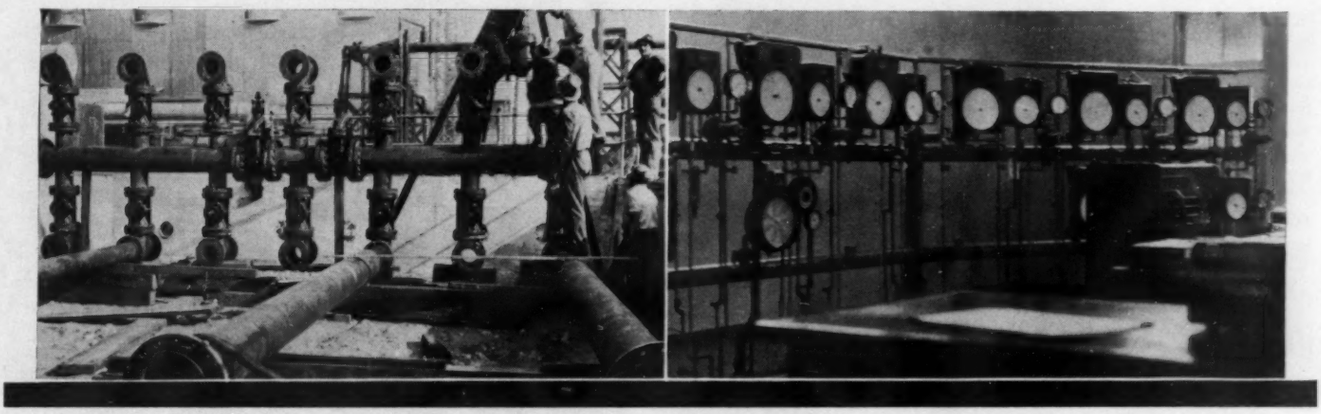
Valve operations and orifice inspections can be made from removable steel grate catwalks equipped with regulation safety guard rails and toe boards. Pressure taps for the indicating gauges on individual trunk lines, are made on the down stream side of the last valves so pressures may be observed even though the trunk lines might be separated from the supply at the central station and fed from some other point in the district.

All orifice meter taps are of the flange type and all gauge lines to the instruments are ½ inch in diameter except the last few feet where the pipes enter the building. One-quarter inch lines are used for the final connection to the gauges. The pressure- and volume-regulating instruments are located in a building adjacent to the meter pit. Each control unit consists of one recording differential gauge, one indicating pressure gauge connected to the corresponding trunk line, one indicating pressure gauge showing the operating pressure on the remote controlled regulator diaphragm, and one remote control regulator or pilot.



**Metering and regulating equipment at central station; control building in upper right corner. View taken from holder.**

**LEFT: Looking east, between upper and lower tier of metering tubes. Work completed. RIGHT: Looking toward control building from lower tier of tubes. Gauge piping arrangement in background.**



**LEFT: Header construction at central station. RIGHT: Arrangement of meter gauges in terminal building.**

The gas for actuating the pilot regulators is taken from three separate high pressure lines to insure continued operation in the event of loss of pressure at any two of the sources. All of the instruments are mounted on pipe standards in the form of an arc in the main control room where the dispatcher can view them without leaving his desk.

The building is of steel stud and metal lath, and plaster construction; asphaltic tile being used to cover the reinforced concrete floor. The steel deck type roof is covered with one layer of insulating material and one of composition roofing. Special accoustic plaster was applied to the interior. There are, in all, five rooms—the control room, two private offices, a gas testing laboratory, and a lavatory. The control room, as stated before, contains all of the pressure recording and indicating instruments as well as the apparatus for gas volume control and measurement. The switchboard for the company's private telephone system which extends from Kettleman Hills to Long Beach is also located there. The chief gas dispatcher occupies one of the private offices, while the superintendent of transmission is located in the other.

The gas testing laboratory contains the instruments for specific gravity and B.t.u. determinations.

The new station, serving as the gas dispatching headquarters for the entire system and the main center of control for Southern California, has now been in operation for several weeks and the anticipated benefits are now being realized.

## Corfield Named President So. Calif. Meter Ass'n

PRESIDENT F. E. Bradley at the conclusion of Southern California Meter Association's June 25 meeting, passed the gavel of office to Guy Corfield, research engineer for Los Angeles Gas and Electric Corp. and president for S.C.M.A.'s new fiscal year. Elections at the June meeting brought into office the following panel:

GUY CORFIELD

President: Guy Corfield, Los Angeles Gas and Electric Corp.

Vice-President: J. B. Taylor, Signal Oil Co.

Secretary: G. S. Duncan, General Petroleum Corp.

Treasurer: W. L. Kindred, Southern Counties Gas Co.

Program Chairman: R. F. Angell, Union Oil Co.

Entertainment Chairman: J. Dunn, American Recording Chart Co.

Membership Chairman: W. D. Cleghorn, Tunnell, Wood & Neilan, Inc.

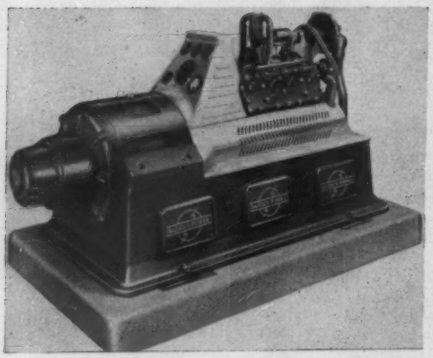
Standards Chairman: H. A. Faull, Southern Counties Gas Co.

By-Laws Chairman: W. F. Crane, Geo. F. Getty Gasoline Co.

Publications Chairman: Geo. Forster, Texas Co.

Preceding the annual elections the members were entertained with musical numbers and also witnessed two interesting sound-motion pictures. H. L. Short of the Union Oil Co.'s public relations department staged the pictures, the first being on the subject of petroleum geology, and the second on deep sea fishing.

The meeting was held at Lakewood Country Club, Long Beach, Calif.



## New Gas-Fueled Power Generating Unit

BARDCO Corp., Hollywood, Calif., has begun production of a gas-fueled electric generating unit that is equipped with either full or semi-automatic starters that permit control from one or more push buttons at convenient locations. The power unit can be run on natural gas, gasoline, butane or diesel fuel. The Bardco power plants are available with generators for delivering direct or alternating current in 110-220- or 440 volts, in one, two or three phase and 50 or 60 cycles. The range of capacities is from 10 to 150 kw.

All bearing surfaces are lubricated by a pressure feed closed system. The cooling system is also totally enclosed. Automatic warning devices are attached to the lubrication and cooling systems to prevent over-heating due to low oil or water supply. The unit is equipped with automatic voltage regulators to provide constant delivery irrespective of the load demand and has an automatic speed governor.

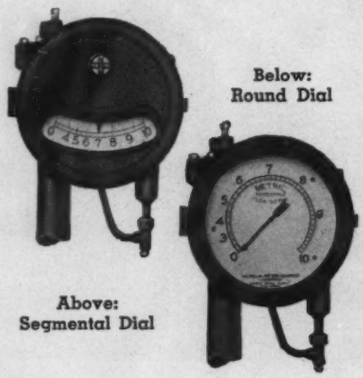
The unit shown in the accompanying illustration is the Bardco Model 25-F-F-N-T which has a capacity of 25 kw.

■ ■

## New Design for Round Case Indicating Flowmeters

AMERICAN METER CO. has just announced a new indicating flowmeter case of advanced design.

This type of installation used to indicate the rate of flow of air, gas, oil, steam or water through a line in which an orifice is installed consists of a modified U gage in which mercury is used as a liquid seal. A sturdy and attractive case encloses the pointer and dial. A steel float which rests in the mercury in one of the columns is raised by the rise of the mercury. The float is attached by a lever to a horizontal bearing shaft which extends through an adjustable lapped stainless steel stuffing box into the case.



Below: Round Dial

Above: Segmental Dial

The differential ranges are: 0 to 100, 0 to 50, 0 to 20, and 0 to 10 inches of water, as specified by the customer. Special ranges are available. Two types of cases can be obtained; the round dial and the segmental dial, as illustrated.

The construction of the differential gage is forged steel throughout, the seal tube screwed and welded. All parts within the mercury chamber are stainless steel. Complete engineering data and specifications may be obtained from American Meter Co.'s general office at 60 42nd Street, New York, N. Y., or from any of the company's factories or sales offices.

■ ■

## Cutler-Hammer Moves Office

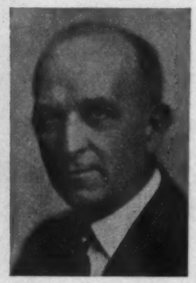
The Los Angeles Sales office of Cutler-Hammer, Inc., Milwaukee, Wis., manufacturers of electric motor control apparatus, has moved to new quarters at 1331 Santa Fe Avenue, Los Angeles, Calif. Here they will continue to carry a complete stock of C-H standardized motor control, safety switches and electrical specialties for quick delivery. This office is in charge of Mr. W. G. Tapping.

## Basford Co. Housed in New Office Structure

H. R. BASFORD CO., San Francisco, which this year is celebrating its 30th year of service to the western gas industry, last month moved into a new six-story office and warehouse building at 425 Second Street.

In its new quarters the company has 50,000 square feet of floor space which houses offices, warehouse, and display room. Also included is an assembly room seating 75, and equipped with talking picture facilities.

H. R. BASFORD



GEO. P. EGLESTON

H. R. Basford Co., of which H. R. Basford is president, Geo. P. Egleston, general manager, and Frank A. Cressey, Jr., vice-president, for many years has distributed a number of leading appliance and equipment lines to utilities of the west coast, among them the following: Sprague gas meters, Frasser gas furnaces and circulating heaters, Ruud water heaters (both domestic and commercial), Tappan domestic gas ranges, Kelvinator gas and electric ranges, Kelvinator electric refrigerators and electric water heaters, and Prima electric washers and ironers.

■ ■

## Carbon Black Production Highest in Years

DURING 1935 241,589,000 M c.f. of natural gas were burned in the manufacture of black carbon as compared with 229,933,000 M c.f. consumed in 1934, according to latest figures furnished by the Bureau of Mines, Department of the Interior.

The 1935 figure was equivalent to about 13 per cent of the total consumption of natural gas last year. The average yield of carbon black in 1935 was 1.46 lbs. per thousand cu. ft., as compared with 1.43 lbs. in 1934.

Production last year has been the highest in recent years (352,749,000 lbs.), being exceeded only by the production of 1929 and 1930. Demand reached a new peak, domestic and export sales totaling 387,536,000 lbs. as compared with the previous high record of 374,468,000 lbs. in 1933.

■ ■

## Alberta Line Extended

The partially constructed duplicate transmission line of Northwestern Utilities, Ltd., between Edmonton and the Viking field, Alberta, Canada will be extended this summer with the laying of 5½ miles of 12¾-inch pipe, according to company officials.


CONNELLY REGULATORS for APPLIANCES

Regulators for Pilots, Refrigerators, Ranges and All Appliances.

The Connelly Jr. (upper left) is made in ¼" Size only — Compact, simple and sensitive for small capacities.

Connelly Type DCS—Spring Loaded; and Type DCW—Weight Loaded — are designed for long service with a minimum of maintenance. They are rugged, simple and direct acting; occupy small space and give accurate control.

+ + +

CALOROPTIC BTU INDICATOR
BACK PRESSURE VALVES
U-GAUGES—$H_2S$ TESTERS

+ + +

Connelly Iron Sponge & Governor Company
Chicago, Ill. 3154 South California Ave.
Elizabeth, N. J. 200 South Second Ave.
N. E. Agent—Theo. H. Piser, Wellesley Hills, Mass.

A quarter of a century of specialized experience and a modern plant equipped for and devoted exclusively to the manufacture of all types of Regulators are guaranties of satisfactory performance of Reliance products.

# See What's Inside

All types of Reliance Regulators are designed for (1) precise performance, (2) minimum maintenance, (3) accessibility and interchangeability of parts and (4) long life. Study the inside construction of any Reliance Regulator and you will see how these essentials have been obtained.

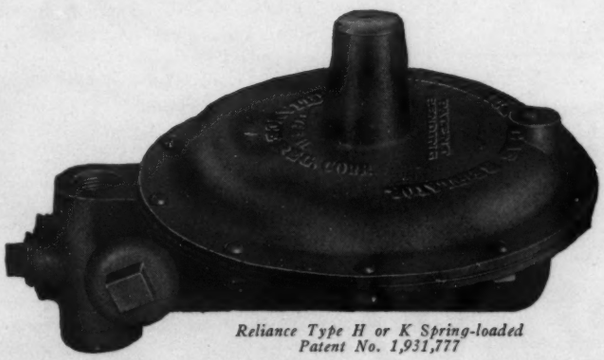
Reliance Types "H" and "K" shown here have all these features: sensitive pressure regulation; positive lock-up when consumption ceases; minimum pressure loss in the Regulator; large flow capacity; rugged construction and long life.

Specially designed toggle action gives a longer and more powerful thrust on valve seat and results in lower lock-up pressures. Valve seats can be removed or changed in size without disassembling the regulator. Diaphragms may be leather or composition depending upon the character of the gas. Leakproof and tamper-proof. Made in 8 sizes, ¾" to 2". Send for Bulletins Nos. 31 and 38.

Reliance Regulators are made in complete lines for domestic, district and industrial purposes, for natural, manufactured, butane and propane gases.

REGULATORS YOU CAN RELY ON
RELIANCE
SINCE 1910

*Reliance Type H or K Dead-weight*



*Reliance Type H or K Spring-loaded*
*Patent No. 1,931,777*

**RELIANCE REGULATOR CORPORATION**
**1000 Meridian Avenue Alhambra, California**

*Regulators for Manufactured, Natural and Butane Air Gases*

**RELIANCE REGULATORS**

# Ad-Men Conclude Meeting at Boston

AS THIS issue of *GAS* goes to press, advertising executives of the country's utility companies are concluding the annual meeting of the Public Utilities Advertising Association, held June 30 at the Hotel Statler in Boston. This meeting was one of the departmental features of the Advertising Federation of America's 32nd annual convention.

J. R. Pershall, of the Public Service Co. of Northern Illinois, and president of the association was due to open the meeting with a report on the present status of the organization.

On the program was a symposium on kitchen modernization conducted by editors of prominent women's magazines, including Mrs. Mary Gillies, associate editor of McCall's, who spoke on recent developments in this field; Miss Katharine Fisher, director, Good Housekeeping Institute, whose talk was entitled "What Women Have Told Me They Want"; Miss Grace Pennock, associate editor of the Ladies Home Journal, who spoke on "Kitcheneering in a Skyscraper"; and Miss Ada Bessie Swann, director, Home Service Center, Woman's Home Companion, whose topic was "Bringing the Facts Home to Public Utilities." Edgar Kobak, vice-president of Lord and Thomas, addressed one session on the subject of "Institutional Advertising—Its value to the Utility."

Following a special luncheon, the association members saw a special moving picture, "A Cycle of Service," presented by the Public Service Corp., of New Jersey. Kenneth Magers, Union Gas and Electric Co., Cincinnati, gave the report of the Better Copy Contest Committee. Will C. Grant, advertising director of the Lone Star Gas Co., Dallas, led a symposium on the use of radio by public utility advertisers. Henry Obermeyer, Consolidated Edison Co. of New York, Charles W. Person, American Gas Association, Clarence Davis of Batten, Barton, Durstine & Osborn, Arthur P. Kelly of the Rochester Gas & Electric Co., and R. S. McCarty of the Philadelphia Co., were among those participating. Henry Obermeyer read a report on the A.G.A. cooperative advertising plans.

## Gas Service Distributing Air Conditioning Units

THE Gas Service Co., Kansas City, Mo., has recently signed an agreement with the Waukesha Motor Co. to become distributor of the Waukesha commercial type ice engine throughout the area served by the company.

First step will be the installation of two units in the Plaza office of the Kansas City Gas Co. to be used for demonstration purposes and to lay the groundwork for sales possibilities in the future.

The Ice Engine, which is suitable for air conditioning in large residences, small office buildings, schools, banks, etc., has a capacity of 7 tons (equivalent to 7 tons ice melting effect in 24 hours). As it operates on natural gas, there is no crank case dilution of lubricating oil, no carbon formation, or other operating problems. It is furnished in single or multiple units.

■ ■

## Wisconsin City Buys Interstate Plant

The Interstate Power Co., headquartering in Dubuque, Iowa, recently announced the sale of its Owatonna, Wis., natural gas properties to the Owatonna Municipal Utilities System for the sum of $125,000. The franchise of the Interstate Co. had one more year to run, and contemplated earnings for this year were taken into consideration in the purchase price.

The Owatonna municipal plant will be operated under the supervision of F. E. Snyder. The Interstate Co. will continue to maintain offices in Owatonna to care for the company's other interests in adjoining territory, according to company manager Frank A. Dostal.

■ ■

## Water Heating Sales Drive Doubles Quota

With sales of 698 units, the natural gas water heater campaign of the San Joaquin Light and Power Corp. closed June 15 as one of the company's most successful sales efforts, according to Monty Pfyl of the company's general gas sales department. With the quota set at 325 units, the sales represented a 214 per cent quota accomplishment.

Gas water heating advertising—billboard, newspaper, direct mail, and radio—formed a background for the efforts of both salesmen and dealers. The campaign stressed salesman and dealer cooperation. The company stood one-third the costs of dealer newspaper and radio advertising devoted to gas water heating.

■ ■

## Philadelphia Centennial

To commemorate the anniversary of its 100th year, the Philadelphia Gas Works has published a colorfully illustrated and historically interesting customer booklet called "A Picture Pilgrimage." Starting with a brief outline of company history since its inception in 1836, the book continues to give a nutshell resume of the many activities carried on by the Philadelphia company in serving a community of 2,000,000 people.

ROBERTSHAW
I'M THE ROBERTSHAW OVEN-HEAT-CONTROL ROBOT DIAL
You'll find me on this gas range. When you turn me to the oven temperature for baking and your recipes, watch the baking and roasting instead of you. Use me and I'll give you many a vacation from the kitchen
SEE REVERSE SIDE FOR PRICE OF THIS MODERN GAS RANGE
"HERE LADY-

buy *this* gas range because it has Robertshaw oven-heat-control!" That, in effect, is what this lively little figure shouts when you hang him on your Robertshaw-equipped gas ranges. He ties right up with Robertshaw national advertising—running now.

He'll help you sell. He's a price tag, too. Write for a quantity.

ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD, PA.

HYDRAUGER
MODERN HORIZONTAL BORING MACHINE
For Underground Installation of Pipe and Conduits. Avoids damage to costly pavements and saves time. Send for Bulletin.
HYDRAUGER CORPORATION, Ltd.
116 New Montgomery St.
San Francisco, Calif.

AIR CONDITIONING
Electrogas
HEATING EQUIPMENT
FURNACES BLOWERS FILTERS WASHERS
*Write for attractive Dealer proposition*
ELECTROGAS FURNACE & MANUFACTURING CO.
2575 Bayshore Boulevard, San Francisco

# BUTANE-PROPANE NEWS

## Liquefied Petroleum Gas Sales Jump 36.2 Per Cent Above 1934 Total

SALES, or the marketed production, of liquefied petroleum gases for domestic, gas company, and industrial uses, reached 76,855,000 gallons in 1935, or 20,428,000 gallons (36.2 per cent) more than the 1934 requirements of 56,427,000 gallons, according to reports submitted to the United States Bureau of Mines, Department of the Interior. The fast-growing market for liquefied petroleum gases during recent years is illustrated in Table No. 1.

The respective demands for the several liquefied gases included in this annual study, all showed substantial gains in 1935 over the previous year. Deliveries of propane increased 34.1 per cent, while butane showed a raise of 33.4 per cent, and the market demand for propane-butane mixtures nearly doubled.

Utilization totals for 1935, compared to 1934, are given in Table No. 2, which breaks down the total marketed production into its use for domestic, gas manufacturing, and industrial purposes. The same table shows how the products moved to market, by different types of transportation, including cylinders or drums, tank cars, tank wagons and pipe lines.

The most important present use of propane gas is for domestic purposes, although the requirements in the industrial field are rapidly mounting. In 1935, 18,325,000 gallons of propane, or about 53 per cent of the total deliveries, were credited to domestic uses, which compares with 15,236,000 gallons, or 59 per cent in 1934. During the same years the industrial use of propane increased from 10,283,000 gallons, or 40 per cent of total deliveries in 1934, to 15,628,000 gallons or 45 per cent of the total in 1935.

Butane is used principally as an industrial fuel, 27,689,000 gallons out of total deliveries of 34,084,000 gallons, being consumed in 1935 compared with 19,443,000 gallons in 1934 out of a total of 25,553,000 gallons. Sales of butane to gas manufacturing plants declined from 5,064,000 gallons in 1934 to 5,042,000 gallons in 1935, but deliveries for domestic purposes in 1935, although small in volume, registered a 30 per cent gain over 1934.

The American Gas Association has furnished the Bureau of Mines the following data regarding the distribution of liquefied petroleum gases:

"At the end of 1935, liquefied petroleum gas was being delivered through mains to consumers in 163 communities in 29 States by 68 companies supplying 29,516 customers.

"Butane-air gas with heating value ranging from 520 to 900 B.t.u. per cu. ft. was supplied to 105 communities in 28 States by 57 companies. A mixture of undiluted butane and propane gas with a heating value of 2,800 to 3,000 B.t.u. per cu. ft. was supplied to 14 communities in California and Nevada by 6 companies. Undiluted propane gas with a heating value of 2,550 B.t.u. per cu. ft. was supplied to 44 communities in Maryland, Minnesota, New Jersey, North Dakota and Wisconsin by 5 companies."

The shipment of liquefied petroleum gases in bulk, that is, by tank cars, tank wagons, and pipe lines showed a 50 per cent increase in 1935 compared with 1934, while cylinder and drum shipments remained practically the same in 1935 as in 1934.

Thirty distributors of liquefied petroleum gases, 12 of which operate in the Pacific Coast area, furnished the statistical data embodied in this report for 1935. A regional analysis of the distribution of liquefied petroleum gases shows deliveries in the Pacific Coast area totaling 17,678,000 gallons in 1935, compared with 11,471,000 gallons in 1934. The increase in the California area of over 6,000,000 gallons was confined largely to industrial uses, although gas companies required about 1,700,000 gallons more of liquefied gases in 1935 than in 1934. The demand for liquefied petroleum gases east of the Rocky Mountains totaled 59,177,000 gallons compared with 44,956,000 gallons in 1934. In this gain of 14,000,000 gallons, propane sales account for about 7,800,000 gallons, and butane about 5,300,000 gallons. The industrial demand for liquefied gases in this area increased 11,000,000 gallons in 1935 compared with 1934, while deliveries for domestic use were greater by 3,500,000 gallons in 1935 than in 1934. The use of liquefied petroleum gas by gas companies east of the Rockies declined 420,000 gallons in 1935 from the previous year.

The liquefied petroleum gas totals for 1935 were released last month in Mineral Market Reports No. M. M. S. 457, prepared

**TABLE NO. 1—SALES OF LIQUEFIED PETROLEUM GASES, 1930-1935, IN THOUSANDS OF GALLONS**

| Year | Propane | Butane | Propane-Butane Mixtures | Pentane | Total |
|---|---|---|---|---|---|
| 1930 | 11,500 | ..... | 6,517* | ..... | 18,017 |
| 1931 | 15,000 | ..... | 13,770* | ..... | 28,770 |
| 1932 | 15,182 | 14,662 | 3,417 | 854 | 34,115 |
| 1933 | 15,835 | 19,056 | 3,226 | 814 | 38,931 |
| 1934† | 25,845 | 25,553 | 3,107 | 1,922 | 56,427 |
| 1935 | 34,655 | 34,084 | 5,651 | 2,465 | 76,855 |

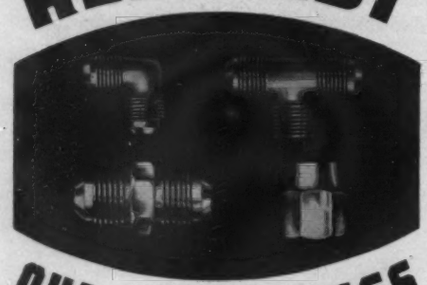
*Butane, propane-butane mixtures and pentane.
†Revised figures.

**TABLE NO. 2—MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GASES BY USES AND METHODS OF TRANSPORTATION, 1934 AND 1935**
**(Thousands of gallons)**

| | Propane | Butane | Pentane and Propane-Butane Mixtures | Total 1935 | Per Cent 1935 | Total 1934* | Per Cent 1934* |
|---|---|---|---|---|---|---|---|
| *By uses:* | | | | | | | |
| Domestic | 18,325 | 1,353 | 1,702 | 21,380 | 27.8 | 17,681 | 31.3 |
| Gas manufacturing | 702 | 5,042 | 1,837 | 7,581 | 9.9 | 6,298 | 11.2 |
| Industrial and miscellaneous | 15,628 | 27,689 | 4,577 | 47,894 | 62.3 | 32,448 | 57.5 |
| Total 1935 | 34,655 | 34,084 | 8,116 | 76,855 | 100.0 | 56,427 | 100.0 |
| Per cent 1935 | 45.1 | 44.3 | 10.6 | 100.0 | ..... | 100.0 | ..... |
| *By methods of transportation:* | | | | | | | |
| Cylinders or drums | 13,420 | 279 | 1,699 | 15,398 | 20.0 | 15,379 | 27.3 |
| Tank cars, tank wagons and pipe lines | 21,235 | 33,805 | 6,417 | 61,457 | 80.0 | 41,048 | 72.7 |
| Total 1935 | 34,655 | 34,084 | 8,116 | 76,855 | 100.0 | 56,427 | 100.0 |

*Revised figures.

KEROTEST



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*for every propane gas installation*

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Each one is individually inspected to insure smooth, finished seats and clean-cut threads — then individually protected by cardboard ferrules and carefully packed in strong, iron bound boxes,—your assurance of receiving them in factory-perfect condition.

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

BUTANE

Liquefied Petroleum Gas

ENGINEERING

EQUIPMENT

*Pioneers in the application of Butane to Internal Combustion Engines.*

AMERICAN LIQUID GAS CORP.

650 S. Grand Ave., Los Angeles, Calif.

by A. T. Coumbe, Jr., associate economic analyst of the Bureau of Mines, Petroleum Economics Division, and A. G. White, chief economist.

■ ■

## Another 25,000-Gallon Butane Tank for Spokane United

SPOKANE (Wash.) United Railway Co's. plans for the current year include complete motorization of its rolling stock. At present the company is operating some 100 buses that are fueled with butane.

To provide fuel storage and fueling facilities for the additional buses, Parkhill-Wade, Inc., Los Angeles, is installing a 25,000-gallon butane storage tank and in connection with it will build a fueling and metering unit capable of handling two buses at a time. Last summer another 25,000-gallon tank was installed, and some time previously two, 12,500-gallon tanks. Thus the new tank brings the company's total of butane storage facilities to 75,000 gallons.

The new tank, like the one installed last summer, measures 10 feet 6 inches in diameter and 46 feet in height, is designed for a working pressure of 125 pounds and is equipped with Shand and Jurs gauges. It is being set up along side the other 25,000-gallon tank, and the fueling and metering unit will be connected to the two tanks. The tank installed last summer is 300 feet from the set of two 12,500-gallon tanks and its fueling unit. The first 25,000-gallon tank at present is connected to the original fueling unit. With the addition of the new fueling unit, which will be identical to the original one, it will be possible to fuel four buses at a time.

■ ■

## Cooking School Provides Low Customer Contact Cost

The annual cooking school program of the Oklahoma Natural Gas Co., concentrating its March and April activities in small towns (number of meters varying from 60 to 5,000) in 39 two- and three-day schools achieved a total attendance of 11,008 at a cost per customer contact of 19 cents. Appliances were furnished by cooperating dealers. A variety of activities such as cake-baking contests, clinics, a fashion show depicting fashions for the "Modern Homemaker in Her Modern Kitchen" were featured at various cooking schools. Outstanding in the series was a gas appliance show with 17 cooperating dealers, sponsoring a daily half-hour radio program.

■ ■

## So. Calif. Gas Co. Makes Personnel Changes

The following changes in personnel have been announced by the Southern California Gas Co.: H. E. Davidson, formerly sales promotion engineer, is now assistant superintendent of the Customers Department. Taking Mr. Davidson's place as sales promotion engineer is E. J. Strickland, formerly sales supervisor of the Eastern Division. George Porter, Van Nuys district agent, will go to Visalia as manager of the San Joaquin Valley Division. His place in Van Nuys will be taken by J. H. Ragsdale, district agent of Banning. The new Banning district agent will be C. K. Graham.

## Demonstration Truck Starts Nation-Wide Tour

The Spencer Thermostat Company of Attleboro, Mass., has inaugurated a new field demonstration service which is now on a nation-wide tour. A complete line of Klixon Thermostats, traveling by truck, is paying visits to gas companies and gas appliance manufacturers throughout the country.

During these visits demonstrations of the thermostats in operation, and service and other helpful instructions are given to the salesmen, engineers and service men of these gas companies. The demonstration is under the supervision of a Spencer Thermostat engineer who discusses problems, answers questions and gives ideas and advice on Klixon temperature control for gas-heated appliances.

Included in the Spencer traveling show will be a complete line of Klixon room thermostats, both all-gas and electric actuated; pressure switches; pilot safety switches and valves; relief valves, and many other Klixon units.

■ ■

## W. Hubert Tappan in Charge of So. Calif. Business

The Tappan Stove Co. of Mansfield, Ohio, last month announced that W. Hubert Tappan has assumed charge of the company's business in Southern California, with the continued assistance of Harry R. Mayer, Tappan's Southern California representative for the past several years. Ray B. Wheeler, who as Pacific district manager is in charge of the territory from Denver west, has been headquartering in Southern California temporarily, but is now moving back to his former San Francisco headquarters.

Mr. Tappan for more than 15 years was vice-president of the Tappan Stove Co. in charge of all sales and merchandising.

■ ■

## Brooklyn Co. Hits All-Time May Sales Record

Brooklyn Union Gas Co., Brooklyn, N. Y., reports the sale of $1,000,000 worth of gas appliances during the first five months of 1936. This figure represents an all-time high, being $160,737.26 or 18 per cent above the previous all time high, established during the first five months of 1935.

During May, sales totaled $325,090.44, a new all-time record for the month, and a figure which has been exceeded only twice previously—in September, 1930, and again in September, 1931.

■ ■

## Engineers Honor Munyan

E. A. Munyan, superintendent of Distribution and Transmission of the Union Light, Heat & Power Co., Cincinnati, Ohio, was recently elected chairman of the Cincinnati chapter of Registered Professional Engineers. There are approximately 750 registered engineers in Cincinnati.

■ ■

## Stewart Visits Pacific Coast

Roy L. Stewart, vice-president of the Stockham Pipe & Fittings Co. of Birmingham, Ala., made a recent business trip to the Pacific Coast, stopping in Los Angeles with Elwood M. Jones, Pacific Coast sales manager for the Stockham company.

## Woods Cross Refinery Gets Butane-Propane Unit

Construction of a production unit for extracting butane-propane mixtures from refinery vapors at the Woods Cross, Utah, refinery of the Wasatch Oil and Refining Co., of Salt Lake City, was begun in June and completion is expected in the latter part of this month. Parkhill-Wade, Inc., Los Angeles, designed the unit and are making the installation. In connection with the production unit a 15,000-gallon storage tank and fueling facilities for trucks and buses will be erected. Woods Cross is some 6 miles out of Salt Lake City.

A large market in and about Salt Lake City is anticipated for the butane-propane mixtures as a fuel for trucks and buses and for domestic purposes.

■ ■

## "Odor" Case Judgment May Affect Gas Companies

All Oregon "odor producing" manufacturing plants and business concerns, among them the gas companies of the northwest area, are awaiting the outcome of a rehearing of Portland, Ore.'s "odor" case, pending before the state supreme court in Salem.

A $440 judgement against the city of Portland was recently awarded two citizens because of odors arising from a garbage fill near their property. The city of Portland appealed. Should the judgement be upheld it is feared that similar "odor" suits might become prevalent against gas companies and other "odor producing" businesses.

■ ■

## Skelgas Co. Expands in Minnesota Area

The Northwestern Skelgas Service Co., bottle gas firm associated with the Skelly Oil Co., opened offices last month in Alliance, Minn. under the management of Lon Clinkenbeard. In charge of the formal opening of the new office was Harry G. Neumayer, formerly superintendent of the Paxton, Neb. schools, recently appointed as Alliance sales manager for the company. Besides the sale of gas, delivered in 100-lb. tanks, the company will sell gas burner equipment and restaurant ranges.

■ ■

## Brooklyn Union Booklet

An unique consumer booklet, stressing the advantages of gas over other fuels and featuring a recently reduced rate schedule, is a sales promotion offering of The Brooklyn Union Gas Co., Brooklyn, N. Y. The book contains 30 pages of data, sales material, pictures of equipment. Numerous cartoons hold the reader's interest.

■ ■

## Anacortes Plant Sold

Local business men of Anacortes, Washington last month completed negotiations to purchase the Anacortes properties of the Natural Gas Corp. which distributes butane-air gas to the community. The company was incorporated as of June 1 with R. Donald Scott, formerly of the Shelton office of the Natural Gas Corp., as manager .

TWO KINDS OF STRENGTH

Strength is naturally of vital importance in the construction of cylinders for Propane, Butane and Butane-Propane mixtures.
But there are two kinds of strength. One is the strength that requires excessive weight.
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That kind of strength has made Hackney liquefied petroleum gas cylinders the leaders of the field.

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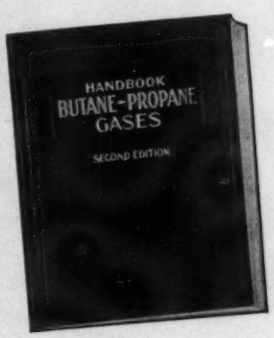


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# Load Building News

P. C. Gas G. A.

THE MODERN FUEL

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(P. C. G. A.)

Volume 8 No. 7 — *Eighth consecutive year of regional cooperative advertising, Pacific Coast Gas Association* — July, 1936

# MID-YEAR PUBLICITY REPORT

In addition to placing gas advertising in Pacific Coast magazines read by domestic consumers, and in leading regional trade journals, the Cooperative Advertising Committee conducts a Gas News Bureau. At the right is reproduced, in miniature, a current advertisement. Below is summarized the first six months' publicity.

## Articles Published January to June

| *Publication* | *Number of Stories* |
|---|---|
| Sunset Magazine | 4 |
| California Federation News | 3 |
| Parent-Teacher Journal | 3 |
| California Parent-Teacher | 2 |
| California Homes | 3 |
| News Letter & Wasp | 2 |
| California Arts & Architecture | 3 |
| Architect & Engineer | 6 |
| Western Hotel Reporter | 4 |
| Pacific Coast Record | 8 |
| Pacific Coast Chef | 3 |
| Keeler's Pacific Hotel Review | 6 |
| Western Machinery and Steel World | 2 |
| Western Baker | 1 |
| Western Furniture Retailing | 4 |
| Western Plumbing & Heating Journal | 2 |
| | 56 |

—*Cooperative Advertising Committee*
*by* A. C. Joy, *Chairman*

Gas
"Magic Box" Creates
ETERNAL MAY
In the House of New Ideas
July? January? Don't believe the calendar! It's always spring within this multi-modern home, planned for year around, all around living. A gas-fired magic box, in crystalline black and chromium, adorns the basement playroom — heats in winter, cools in summer — provides made-to-order indoor weather under carefree automatic control.
Just one example of today's advanced gas appliances — including the most complete line of house-heating equipment ever offered, each type affording the exclusive advantages of modern gas fuel.
From small room-heaters (gas "circulators," radiators, floor or wall units and radiant heaters) to central heating plants (warm air, hot water or steam — with or without summer cooling) there is a perfected gas appliance for every building and budget. Don't endure another winter of outmoded, makeshift heating. Change now to quick, clean, controllable, dependable, economical GAS. — Pacific Coast Gas Association, Inc., (a non-profit service organization of which your Gas Company is a member) 447 Sutter Street, San Francisco, California.
In many communities, special inducements are offered for summer or early fall installation, payments to begin later. Term financing at low cost. Inquire of
LOCAL APPLIANCE DEALERS OR YOUR GAS COMPANY
NEWEST OF THE NEW
Designed by architect H. Roy Kelley, built by Janss Investment Corporation in beautiful Westwood Hills (Los Angeles) and sponsored by Women's Home Companion, THE HOUSE OF NEW IDEAS has thrilled more than 150,000 visitors. ● The automatic gas heating plant, illustrated, also provides forced circulation of filtered, humidified air. ● Restful interiors, decorated and furnished by Broadway Department Store, blend with wooded vistas to create inspiring charm. ● In pleasing contrast to the white plaster exterior walls and roof of heavy shingles is the soft, warm terra cotta color of entrance walk, steps and porch floor. Both indoor and outdoor living rooms are revealed in these views.
Gas
SCHEDULED IN JULY AND AUGUST
DOMESTIC, ARCHITECTS' AND
BUILDERS' MAGAZINES

—Advertisement

# West Coast Manufacturers Affiliate With National Association

AFTER several months' study and discussion, the Pacific Coast Gas Association has entered into an affiliation agreement, on behalf of its Manufacturers' Section, with the Association of Gas Appliance and Equipment Manufacturers. Final details in connection with the agreement were concluded last month. While the effective date is named as March 31, 1936, the agreement covers the whole fiscal year which began on October 1, 1935.

Through the A.G.A.E.M.'s affiliation with the American Gas Association, under which its members may belong to the A.G.A. without paying additional dues, the effect of the new affiliation with the P.C.G.A. is that one payment of dues by a P.C.G.A. Manufacturers' Section member includes membership and privileges in all three associations. Dues which apply to the P.C.G.A. manufacturer members are those regularly set for A.G.A. E.M. members, and are equally apportioned between the two associations.

The Manufacturers' Section of the P.C.G.A. under the agreement becomes the Pacific Coast agent of the A.G.A.E.M. The P.C.G.A. elects two members to the Board of Directors of the A.G.A.E.M and while they have a voice in the affairs of the national association, the Pacific Coast group can act by itself in the solution of local problems.

Meetings held on the west coast by officials of the A.G.A.E.M. last February, reported in this publication's March issue, gave impetus to the affiliation project, which was brought to a successful conclusion last month.

For those interested in the detailed agreement, its full text is offered below.

**AGREEMENT FOR THE AFFILIATION OF ASSOCIATION OF GAS APPLIANCE AND EQUIPMENT MANUFACTURERS AND PACIFIC COAST GAS ASSOCIATION, MANUFACTURERS' SECTION.**

In order to promote the use of gas as a fuel and to promote cooperative relations between manufacturers of gas appliances and equipment, gas utilities, dealers and customers this agreement is made and entered into this 31st day of March, 1936, between the Pacific Coast Gas Association, Inc., in behalf of its Manufacturers' Section, having its principal office at 447 Sutter Street, San Francisco, Calif., and the Association of Gas Appliance and Equipment Manufacturers, having its principal office at 60 East 42nd St., New York City.

*Organization:* Association of Gas Appliance and Equipment Manufacturers recognizes that its objectives as expressed in its By-laws can best be effected on the Pacific Coast by the creation of a regional division which, while an integral part of Association of Gas Appliance and Equipment Manufacturers and adhering to its By-laws, will maintain its own office and have autonomy in local Pacific Coast matters subject to review by Association of Gas Appliance and Equipment Manufacturers. In creating this Pacific Coast regional division Association of Gas Appliance and Equipment Manufacturers recognizes the prior existence of the Pacific Coast Gas Association, Manufacturers' Section, and hereby appoints this organization its agent on the Pacific Coast.

Pacific Coast Gas Association in behalf of its Manufacturers' Section recognizes the advantage which will accrue to Pacific Coast manufacturers through membership in Association of Gas Appliance and Equipment Manufacturers and in accordance with the broad powers granted to the Manufacturers' Section in the By-laws of Pacific Coast Gas Association hereby agrees that Manufacturers' Section may act as divisional agent of Association of Gas Appliance and Equipment Manufacturers in any and all activities for which Association of Gas Appliance and Equipment Manufacturers is organized so long as these activities conform to the objects of Pacific Coast Gas Association and the laws of the United States of America. Pacific Coast Gas Association also agrees that its office and secretarial staff will continue to be at the service of its Manufacturers' Section.

*Territory:* The Pacific Coast is hereby defined as the States of Arizona, California, Nevada, Oregon and Washington and the Province of British Columbia.

*Membership:* All manufacturers of gas appliances and equipment whose principal factory is located on the Pacific Coast and who elect to become members of Association of Gas Appliance and Equipment Manufacturers will also be entitled to membership in Pacific Coast Gas Association, Manufacturers' Section, and will have full privileges of Class "B" membership in Pacific Coast Gas Association. Each member will have full membership privileges in Association of Gas Appliance and Equipment Manufacturers including Manufacturer Company Membership in American Gas Association as set forth in the affiliation agreement between Association of Gas Appliance and Equipment Manufacturers and American Gas Association. Not less than quarterly the Secretary of each Association shall furnish the Secretary of each other Association a complete list of Pacific Coast Manufacturers in good standing and the Board of Directors of the respective Association shall elect new members subject to the provisions of their own By-Laws.

*Dues:* Dues for this joint membership will be the dues fixed annually by the Association of Gas Appliance and Equipment Manufacturers for membership in that body. These dues may be paid either to Association of Gas Appliance and Equipment Manufacturers at its office in New York City or to Pacific Coast Gas Association at its office in San Francisco as a member may elect, but no matter where paid the distribution shall be as follows:

Fifty per cent (50%) to treasury of Association of Gas Appliance and Equipment Manufacturers.

Fifty per cent (50%) to treasury of Pacific Coast Gas Association to be allocated in a manner satisfactory to the Board of Pacific Coast Gas Association and the Executive Committee of the Manufacturers Section.

In case any Pacific Coast manufacturers pay dues direct to the American Gas Association and Associatoin of Gas Appliance and Equipment Manufacturers all or any portion of these dues are returned or credited to Association of Gas Appliance and Equipment Manufacturers, the portion so returned or credited shall be divided fifty per cent (50%) to the treasury of Association of Gas Appliance and Equipment Manufacturers and fifty per cent (50%) to the treasury of Pacific Coast Gas Association. The Secretary of each Association shall render a quarterly accounting and make a quarterly settlement.

*Representation on Governing Board of Association of Gas Appliance and Equipment Manufacturers:* Pacific Coast manufacturers shall be privileged to have at all times two (2) representatives on the Board of Governors of Association of Gas Appliance and Equipment Manufacturers, these representatives to be elected by Pacific Coast Gas Association, Manufacturers' Section.

*Responsibility:* It is expressly understood that Association of Gas Appliance and Equipment Manufacturers and Pacific Coast Gas Association, which in signing this agreement is merely acting for its Manufacturers' Section, shall continue to be separate, distinct and independent of one another and each shall have full and exclusive control over its own business and activities and neither association shall have any voice in or control over the business and activities of the other. Neither association, its officers or members, by the execution of this agreement, shall assume any responsibility or liability, financial or otherwise, for the conduct of any activity by the other association, its officers or members.

*Terms and Revision:* The term of this agreement shall be for the fiscal year October 1, 1935 to September 30, 1936,and will be renewed automatically from year to year for a term of one year unless prior to September 30th of any year affirmative action is taken for its termination by either the Board of Directors of Pacific Coast Gas Association or the Board of Governors of Association of Gas Appliance and Equipment Manufacturers.

Either party to this agreement may propose revision at any time and this agreement may

## Calendar

**July**

*Michigan Gas Association*—Annual Convention with Michigan Electric Light Association, Grand Hotel, Mackinac Island, Mich., July 6-8.

*American Home Economics Association*—Olympic Hotel, Seattle, Wash., July 6 to 9.

*Canadian Gas Association*—Annual meeting, and *Pacific Coast Gas Association*—Northwest Conference, Hotel Vancouver, Vancouver, B. C., July 8-10.

**August**

*Pacific Coast Gas Association*—43rd Annual Convention, Fairmont Hotel, San Francisco, August 25-27.

**September**

*American Chemical Society*—Annual meeting, Pittsburgh, Pa., September 7-12.

*Third World Power Conference*—Washington, D. C., September 7-12.

**October**

*American Gas Association*—18th Annual Convention, Atlantic City, N. J., week of October 26.

*Exhibition of Gas Appliances and Equipment*—First Annual Convention, Association of Gas Appliance and Equipment Manufacturers (In affiliation with the A. G. A. Annual Convention), Atlantic City, N. J., October 25-30.

**November**

*American Petroleum Institute*—Annual Convention, Chicago, Ill., November 9-12.

SERIES 10 CIRCUIT

*Exclusive with Minneapolis-Honeywell*

ONLY Minneapolis-Honeywell can offer the control performance made possible by the exclusive Series 10 Circuit. That is one important reason why it pays to standardize on this superior line of controls. In addition your service department can operate more efficiently and will have fewer calls, and your stock room will have to handle only one line to fill all control requirements. Minneapolis-Honeywell Regulator Co., 401 East 28th Street, Minneapolis, Minn.

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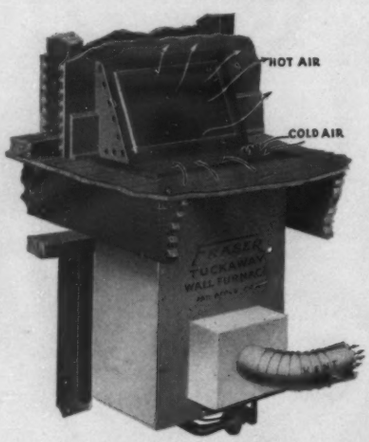


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Made in 4 sizes

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*Distributed by*

H. R. Basford Company
San Francisco Los Angeles

be revised by the action of the Board of Directors of Pacific Coast Gas Association acting in behalf of and with the consent of its Manufacturers' Section, and the Board of Governors of Association of Gas Appliance and Equipment Manufacturers.

## Report Covers Special Rate Plans

A TIMELY report on special rate plans and rate applications such as objective rates, profit-sharing rates, service-at-cost rates, etc., has been prepared by the Rate Structure Committee of the American Gas Association. Copies have already been distributed to member company delegates.

Departure from usual methods of rate application and the adoption in various places of special rate plans has been an outstanding recent development in the utility industry. Keen competition has caused the rate engineer to search for every conceivable method for building up business rapidly without impairing revenues. The objective rate plan which has received so much attention in The Commonwealth & Southern properties has been adopted by a number of gas companies. Likewise the sliding scale principle used in Great Britain for over 80 years has been modified and made use of in this country, notably in Washington, D. C., and Detroit, Mich. The New York Legislature recently legalized its use in that state. Service-at-cost rates providing for automatic adjustment with changes in cost of labor and materials are another comparatively new development. All of these are described in this report by the Rate Structure Committee, prepared under the direction of its chairman, A. I. Phillips.

The report is entirely factual. A description is included of every objective rate, profit-sharing rate and service-at-cost rate, applicable to gas, in effect in the United States (so far as the Committee is aware) up to May, 1936. The operation of the rates is explained where necessary but no attempt has been made to determine their effect on consumption of gas or earnings since few of them have been in existence long enough to permit any sound conclusions to be drawn.

Copies of the report may be secured from Association Headquarters. Price to members $1.00; non-members $2.00.

## P. C. G. A. Issues Historical Booklet

MAILED out to the members of the Pacific Coast Gas Association last month was a neat, trim, blue-bound booklet entitled "The Story of the Pacific Coast Gas Association." Opposite a dedication by the Association's president, H. M. Crawford, appears a picture of the organization's founders taken in 1893.

In the opening pages of the book Chas. B. Babcock, a past president of the Association, contributes a colorful, well written history of the Association and of the men who built it.

Contained in the book are lists of the past presidents, executive secretaries, and charter members of the Association. Three of these latter (C. O. G. Miller of San Francisco, John Kempf, Jr., of Oakland, and Charles F. Adams of Portland) are still living. Honorary members are also listed.

Another portion of the book details the committee structure of the Association, explaining the growth of the committee system, and the most advantageous method of handling committee reports.

The division devoted to various awards offered by the Association carries descriptions of the awards and lists those who have received them. Among the awards are the Addison B. Day Medal of Honor, the P. C. G. A. Gold Medal, and the Basford Trophy.

Also listed in the book are the past chairmen of the Association's several sections.

The P.C.G.A. historical booklet concludes with the Articles of Incorporation, the By-Laws of the Association, and the By-Laws of the Manufacturers' Section of the Association.

## "Yesterday Meets Today"—Radio Theme

"YESTERDAY Meets Today" was the title of a series of radio broadcasts that the San Diego (Calif.) Consolidated Gas and Electric Co. used in connection with recent gas range and automatic gas water heater campaigns.

F. M. Raymond, San Diego Consolidated's superintendent of advertising, hit upon the idea of dramatizing the progress of gas by comparing it with the advancement made in customs and habits with which everyone is familiar. These broadcast skits presented the "then and now" version of speed laws, women's clothes, women's bathing suits, prize fighting, etc.

The programs opened with a girl singing an old popular tune which flowed right into a modern number. This was followed by a short "commercial" dealing with the modern gas appliance. Then came the skit. At the close of the skit the same cast gave a dramatization which pointed out the advantages of modern gas equipment over the old, stressing the point that the old gas range is as out of date as the speed laws and bathing suits of former days. None of the customs dramatized dated further back than the year 1900.

The "Yesterday Meets Today" broadcasts were of 15 minutes duration and were presented twice weekly over a period of two months. Judging by telephone calls to the studio and comments received by dealers from customers and prospects the broadcasts were a decided success. Idea for the series, according to Superintendent of Advertising Raymond, is taken from the book "Old Yesterdays."

# PACIFIC GAS AND ELECTRIC COMPANY

245 MARKET STREET

H. M. CRAWFORD
GENERAL SALES MANAGER

SAN FRANCISCO, CALIFORNIA

To all Gas Heating Appliance Dealers
throughout P. G. and E. territory.

Gentlemen:

The question is often asked: Why push Gas Heating equipment during the summer months?

Why? Because every fall and winter dealers are swamped with inquiries, orders, demands for service. Sometimes the rush is too great to handle and not infrequently orders are lost.

Many dealers felt that if part of this business could be taken care of during the summer, it would be better for them and better for their customers.

Looking at it from their own angle, these dealers realized that they could spend more time on tough customers during the slack season and would, as a result, develop some real "plus" business.

Then, too, they would have a chance to clear their stocks and get ready to take on fresh, new merchandise in the Fall.

From the customers' standpoint, inquiries could be answered promptly. Specifications and estimates could be more carefully drawn. Installations could be made in an unhurried, workmanlike manner.

To put this theory into practice, however, required much stronger sales appeals than these. So the P. G. and E. fostered the idea of a 10% summer discount and October 1 billing.

Manufacturers cooperated by giving Fall dating. The P. G. and E. came back with a vast program of advertising and publicity to give the whole event a "bargain sale" appeal.

Last year we were given an additional selling tool—F.H.A. But long before F.H.A. was even thought of, the Summer Gas Heating Campaign had proved itself.

This year we have all the old inducements—10% off . . . October billing . . . prompt service . . . PLUS F.H.A. on boilers, furnaces and floor furnaces (and substitute plans for other types of equipment.)

The story is now 100% complete. With good reason we can ask the prospective buyer WHY WAIT? Just imagine yourself a prospect . . .

You don't have to pay a cent until Fall. You get careful, unhurried workmanship. And you save 10% on the purchase price.

Think it over! Wouldn't such arguments impress YOU?

Sincerely,

H. M. Crawford

General Sales Manager.

GAS BURNER
Distributors
★ WANTED ★
For NEW Gas Districts

For the Most Complete Line of
Burners and Controls

★

*Write for our*
*Liberal Proposition*

★

NEMEC
Combustion Engineers
*Whittier, California*

*Positive*
Chemical Protection

The positive chemical protection of NO-OX-ID holds pitting and corrosion in check over long periods. The NO-OX-ID Master Coat has high resistance to soil stresses and to the penetration of moisture.
NO-OX-ID lends itself economically to machine or hand application on both new and reconditioned lines. Less tonnage of coating material is required. Data and recommendations upon request.

DEARBORN CHEMICAL COMPANY

Los Angeles:
807 Mateo Street
Phone TRinity 3385

San Francisco:
421 Bryant Street
Phone SUtter 8688

The NO-OX-ID
MASTER COAT

# Transmission Line Flow Factors

*(Continued from Page 21)*

Line. On these routes south to Los Angeles, and in some other cases, the differences in elevation are sometimes in excess of 4,000 feet.

Recognizing these conditions, and due to the fact that formulas for considering elevation were only approximate or unwieldy in their application, a new formula was developed by R. Y. Dakin, who at that time was with the Southern California Gas Co. This formula is expressed as shown in Fig. 1, and all other notations are as generally used by the Weymouth formula.

In Figs. 2, 3, 4 and 5 are shown four assumed variations of a pipe line—level, ascending, descending and a combination of an ascending and descending line—where each is 100 miles long with an inside pipe diameter of 19.5 inches. The volumes computed for each condition by the Weymouth and Dakin formulas are shown with these figures.

It is seen that where differences in elevation are considerable, there is also a very appreciable change in volume. This effect of elevation on an existing pipe line is shown by Fig. 6. Here is shown a profile of a line 177 miles long depicting the principal changes in elevation along its route. The line is assumed to have a constant inside diameter of 25.5 inches with an initial pressure of 415 lbs. abs. and a terminal pressure of 165 lbs. abs. for a level line.

The pressure drops along the line as compared with a level line are also shown, and it will be noted that the terminal pressure of the existing line under the conditions would be 147 lbs. abs. or a difference of 18 lbs. lost due to elevation.

Stated in another manner this would be equivalent to adding about 8 miles to the level line.

As before mentioned, it is apparent that the added equivalent length due to bends, angles, valves, etc., could be anticipated as somewhat in excess of the 3½ per cent found for the Stanpac Line, or say about 5 per cent for the line in Fig. 6 or an equivalent added length of about 9 miles, making a total of 17 miles when including the effect of elevation. This is equal to about 10 per cent of the 177 miles.

The Dakin formula should be found particularly useful when checking the flow in short sections of an existing line where the effect of elevation is apparent.

A pipe line, like any other piece of equipment, should be checked as to its efficiency whenever it seems necessary. The efficiency can only be measured against its performance when new. It is therefore desirable to obtain all the flow data possible when new, which can be used as a basis to check future performance.

In conclusion, so that the Dakin formula may not be misinterpreted, attention is directed to the following fact:

If the formula is correct for the general case of a uniformly inclined pipe line it should also satisfy the special case of a level line.

It will be noted that when $h = 0$ the quantity under the radical sign assumes the indeterminate value 0/0 and it is therefore necessary to evaluate the limit of the function as h approaches zero. When this is done it will be found that the resultant equation for the special case is the Weymouth formula.

## New Room Temperature Control Marketed

Domestic Manufacturing Co., Los Angeles, recently placed on the market a throttling type room temperature control. This unit is designed for use with console gas heaters and is installed on the gas line ahead of the heater.

The thermal element of the Domestic room temperature control is a sylphon bellows which operates a rolled brass valve seated in a brass casting, and the dial is of drawn steel finished in statuary bronze. The construction is such that the unit may be taken apart for cleaning without disturbing the setting. It is available in two sizes, ½-inch and ¾-inch, with 50,000 and 75,000 B.t.u. hourly capacities respectively.

■ ■

## Industrial Data Sheets

The Industrial Sales Committee of the Pacific Coast Gas Association during the month of June published the following four industrial gas utilization data bulletins prepared by member industrial engineers:

No. 32, "Yosemite Portland Cement Co. Kiln at Merced, Calif.," prepared by Monty C. Pfyl of the San Joaquin Light and Power Corp.

No. 33, "Gas-Fired Blacksmith Forges," by Herbert Haas, Pacific Gas and Electric Co.

No. 34, "Ruling Machine Drier," by Hugo N. Johnson, Los Angeles Gas and Electric Corp.

No. 35, "Recuperative Type of Crematory Retort," by Herbert Haas, Pacific Gas and Electric Co.

■ ■

## A.G.A. Offers Second Edition Of Range Manual

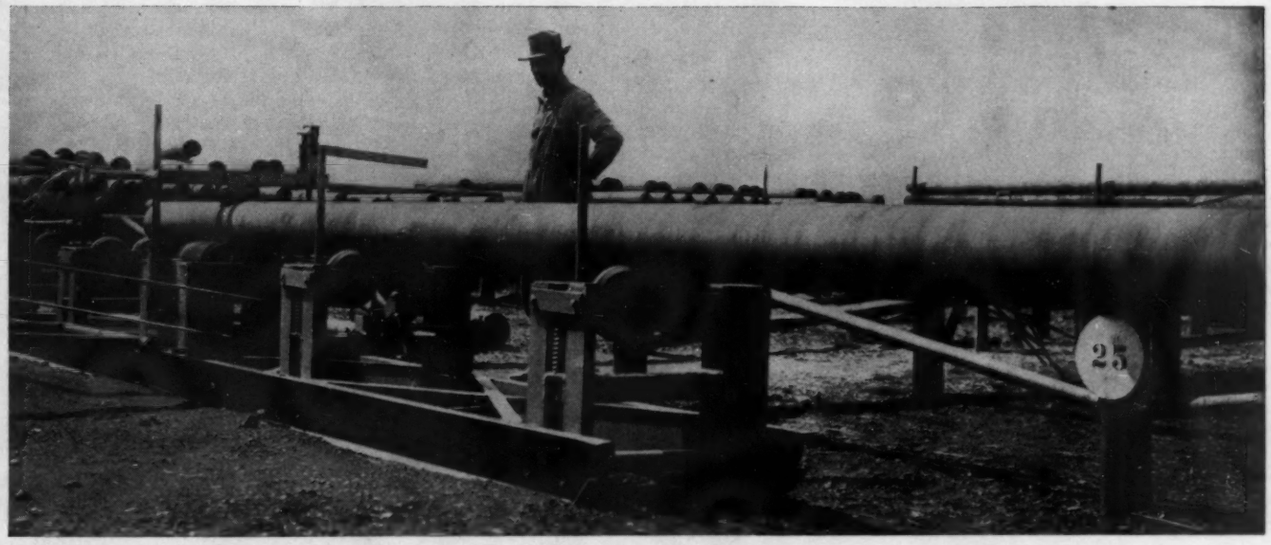
Announcement is made of the second edition of the Gas Appliance Service Range Manual prepared by the Committee of Gas Appliance Installation and Service Manuals of the American Gas Association. Edited to aid and guide those engaged in the installation and servicing of gas ranges, the book contains both specific and general information. The second edition is more than double the size of the first, which is now in use by more than 7,000 gas companies, dealers, plumbers, etc. The book is available from the A.G.A. both in bound and loose-leaf styles, being offered at 75c a copy.

■ ■

## New So. Calif. Gas Co. Office

An office, of frame construction, is nearing completion for the Southern California Gas Co. near Bakersfield. The office, with R. F. Ogburn in charge, will be headquarters for the Kern Division of the company.

## "NEW DEAL" MASTER DE-LUX PIPE CLEANING MACHINE




*Doing a Big Job Well for the Union Gas System, Inc.*

**Someone YOU know uses New Deal Equipment . . .**

**If you are interested in taking-up, laying, straightening or cleaning your pipe lines, write for new illustrated catalog.**

**The NEW DEAL SPECIALTY CO.**
— INC. —
OKMULGEE, OKLA., U.S.A.
Export: Lucey Export Corp.
3505 Woolworth Bldg., New York, N. Y.
Broad Street House, London, E C, 2, England

## THE STANDARD OF WATER COOLING ENGINEERING

In 1929 the first Fluor Aerator Type Cooling Tower was erected. Its successful operation achieved a new goal in efficient and economical cooling. The succeeding short space of time has seen the universal acceptance of this tower as the standard of water cooling engineering.

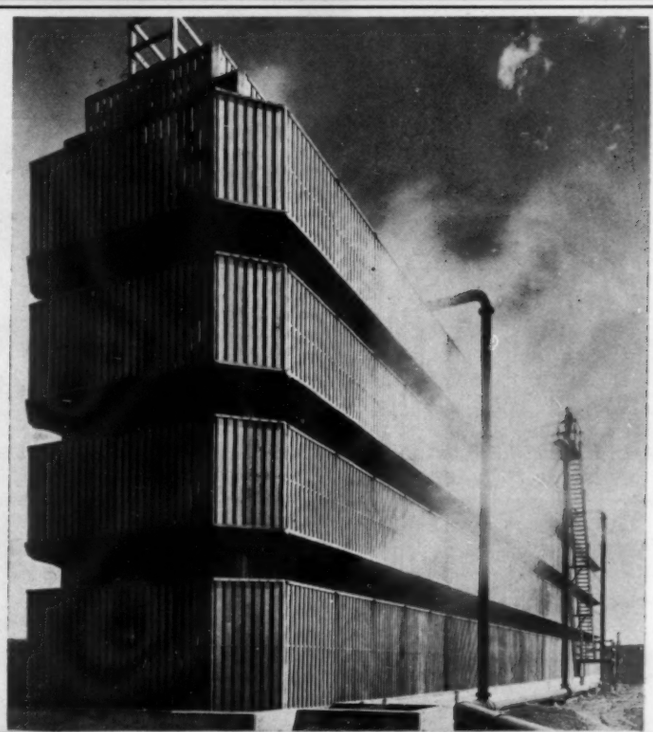
Proof of its superiority rests upon its practical utility for industries' cooling requirements, superiority attested to by increased numbers of new and old customers the world over.

Well established is the fact that today more Aerator Type Towers are being purchased than all other types of atmospheric towers combined.

A new Bulletin, T236, describes Aerator Type Towers in detail. Write for your copy.

**The Fluor Corporation, Ltd.**

909 East 59th Street, Los Angeles, California
30 Church St., New York City, N.Y.
703 Fairfax Bldg., Kansas City, Mo.
909 McCormick Bldg., Chicago, Illinois
1406 Esperson Bldg., Houston, Texas
719 McBirney Bldg., Tulsa, Oklahoma



BE SURE WITH FLUOR

**FLUOR AERATOR TYPE COOLING TOWERS**

# Competition in Commercial Kitchens

*(Continued from Page 19)*

with this installation, we were selling heat controlled ovens, insulation, cooler working conditions, and better quality food, the item of operating cost not being stressed particularly. To our amazement, and largely through the cooperation of the chef, the operating fuel cost of this battery of gas ranges was less than the cost of operating the coal ranges. The monthly gas cost ran and is now running from $18 to $20 per month. Aside from the item of fuel cost, many added savings and advantages were noted. The working temperature in the kitchen was reduced some 40°, quality of food, particularly fried foods, was greatly improved. Uniformity produced by temperature control allowed for duplication of food preparation, which is always an asset in any restaurant. Due to the flexibility and speed of gas as compared to noncontrollable soft coal, the entire technique of food preparation was changed. Small batches of food prepared just prior to serving hours and during serving hours, supplied the cafeteria service bar with freshly prepared and more attractive foods. And, as we all know, cafeteria food is sold on eye appeal. The result of this method of feeding the counters and constant anticipation of demand and closer control of supply, resulted in a saving in food *not* returned to the kitchen which amounted to same $150 per month. So we see the far-reaching benefits, both direct and indirect, of this modern gas range installation. The manager of this cafeteria, a keen student of the business of feeding the public, was quick to see the advantages of gas as a fuel in his operating scheme, and insisted that we continue our efforts in his behalf. An obsolete worn out steam pressure cooker operated from an already overtaxed central heating boiler was eliminated in favor of an insulated heat-controlled gas-fired steam pressure cooker. This self-contained unit is producing at less cost some 40 per cent more steam-cooked foods every day. Coffee urns and steam tables were put on automatic control with resultant savings in fuel. At the present time we are working on the removal or substitution of the present coke-fired bake oven to complete the picture of this "all gas" restaurant.

Perhaps the largest single factor contributing to the success and satisfaction of gas as the major fuel in this establishment, was the splendid cooperation received from the kitchen personnel. From the chef down to the bus boys the attitude was one of "putting the job across." Too much emphasis cannot be placed on this factor of operator cooperation. The stability of our commercial installations, we have come to believe, is directly proportional to the amount of cooperation, intelligent understanding and enthusiasm for our service, that we are able to instill in the mind of the man "on the firing line."

Another interesting fuel conversion recently made was in the kitchen of a prominent women's college in this city where oil ranges were eliminated. As usual, a very careful survey was made of operating cost of existing equipment. Actual measurement of oil used daily was made, and cost computed, based on the then current price of oil. The daily oil consumption averaged 13.358 gallons, or 400.76 gallons for the 30-day test period. Using an oil price of 7.5 per gallon delivered, and with no utilization cost added, the cost averaged $1.002 daily, or $30.07 over the 30-day test period.

Again a proposal was made whereby new modern gas cooking equipment was to replace the college's oil equipment (see Fig 3) on the basis of savings made in the operating cost of the new equipment over the operating cost of the old. Our installation was made (see Fig. 4) comparable in number of units with the old equipment plus two more roasting ovens for which there was a real need. Test meter was installed and results were so obvious after the first week or two that the test terminated at the end of 26 days, and the equipment accepted. Despite the fact that we had installed more equipment than we had removed, we again carried off the "show" with flying colors. Actual gas consumption averaged 734 cu. ft. per day, or 19,100 cu. ft. for the 26 days of the test. At 75c per M c.f. (13.3c per therm) this rate of consumption showed a gas cost of $16.50 per 30-day month as compared with $30 per month to cook with oil. The results obtained with this truly modern equipment, likewise operated with the full cooperation of the chef, were remarkable, when we consider that all the daily food requirements of some 500 girl students of the university were handled on these ranges and roasting ovens.

And so we might go on, time and space permitting, enumerating many interesting examples of replacing obsolete gas equipment in commercial kitchens, of "meeting and beating" competitive fuels. What measure of success we have attained in this particular phase of our business we can attribute to hard and unremitting work—to a dogged persistence and a careful and painstaking survey and cost analysis of each individual job. With no huge kitchens available with their "mile long" range batteries, we have blanketed the field, so that today we believe we are in a rather enviable position regarding our commercial cooking load. As this article is being written, we culminated some two years of sales effort by selling new gas cooking equipment for the kitchens of the city's two leading hotels, replacing in one instance oil, in the other, obsolete gas equipment. This oil replacement marks the death knell of this fuel for commercial cooking in this city.

Believing that some factors in the wealth of experience we have gleaned in this struggle (and it has been a struggle) for the supremacy of gas as a large volume cooking fuel, may be of some interest and assistance to the readers of this article, we take the time to cite some of them.

REFRACTORIES
GENERAL CERAMICS COMPANY
• REFRACTORIES •
For Conversion Burners, Circulating Heaters, etc.
Because they are uniformly accurate, strong, and dependable in every way, General Ceramics Refractories are used by most of the leading manufacturers of gas heating appliances. • Our engineers will gladly cooperate with you.
General Ceramics Company, 30 Rockefeller Plaza, New York

The Goodman Stopper
The Reliable Shut-off for Street Mains
Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.
Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.
Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

1. Of prime importance is this business of public relations, best interpreted by customer confidence. Prompt service and a keen interest in the customer's problems, aside from those involving fuel, help build the respect of the customer. When a restaurant owner consults the "gas company" before making a major purchase of *any* description, there is little more to be desired as regards customer confidence.

2. Cooperation to the extent of enthusiasm on the part of the actual operator of the equipment, is not only to be desired but is absolutely necessary in this fight against competitive fuels.

3. Our experience has shown us that invariably less equipment, by a unit or two, than the customer thinks he needs, should be installed. The result is the proper and full use of all equipment installed, with an increased efficiency of all units.

4. Become "kitchen mechanics"; study meat cookery and food preparation. Become familiar with such terms as meat shrinkage, stock pots, fry work, grease break down, short order work, pot head room. Find out why chefs prefer one type of utensil to another. Be able to tell a chef why charcoal broiling is "the bunk" and that a correctly broiled steak on a gas broiler will also gain and hold customers. Tell a chef why it is not necessary to have 50-lb. steam pressure for vegetable cooking. In short, "know your stuff"; the chef knows his, and only by this knowledge will you command his respect.

5. In a competitive fuel situation remember that invariably the truth about operating costs of your fuel will never hurt you. Admittedly there will be times when "intangibles" will have to be sold along with your fuel, but a careful and thorough survey of all the factors both direct and indirect, involved in each situation, will usually carry you over the "hump."

6. Sell your executives on the desirability of this all important load, gain their confidence and cooperation and you have gained a most important selling tool.

To sum up, a minimum of good equipment correctly sold and correctly used will result in a substantial load increase at a desirable rate level for you just as it did for us. "Thar's gold in them thar kitchens."

■ ■

## Transmission Line To Grand Rapids

*(Continued from Page 23)*

conversion of appliances, 25 in making pick-up calls and 25 making service calls. The men were trained in groups of 50, each group receiving a week of instruction.

The sale of the new product is likewise patterned after the Muskegon plan, with Bernard T. Franck, coordinator of sales, American Light & Traction Co., having the post of acting sales manager. L. H. Verschoor is assistant sales manager.

Fifty salesmen went into intensive training the middle of April, instruction covering a two-week period and preparing salesmen to sell all appliances.

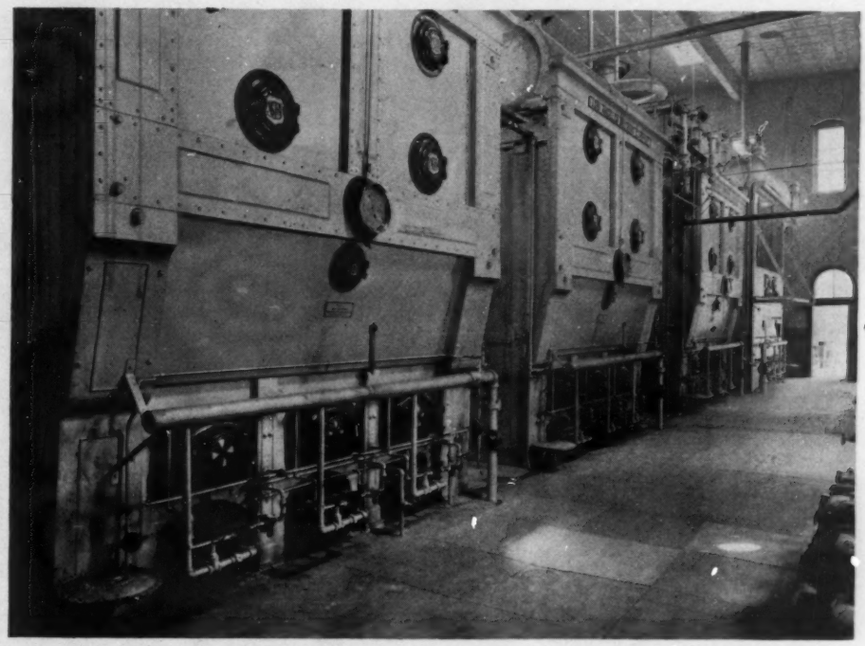
The city has been divided into 20 sales districts. A survey is being made through each district to determine the number of appliances in service and their condition.

Major effort will be exerted in the sale of house heating, this activity being temporarily retarded until final decision is reached on whether straight natural or mixed gas will be served.

All principal advertising media are being employed to carry the message of natural gas to consumers. A 30-minute radio broadcast is conducted regularly five times a week under the title "Home Lovers' Programs." The gas company "Treasure Chest" program is broadcast three times a week.

Newspaper advertising not only sells the fact that it is cheaper to cook, heat and refrigerate with natural gas, but also answers the many questions being asked by the customers about natural gas.

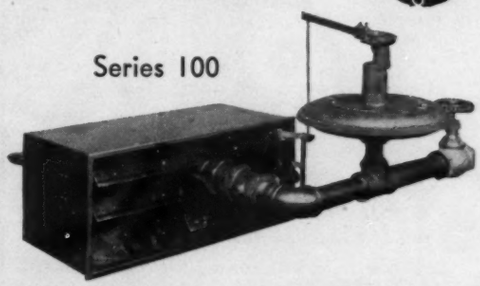
This important Grand Rapids project brings the Furniture Capital of America and the second largest city in the State of Michigan within the scope of natural gas coverage. The 1933 Government estimate credits the city with 176,700 population. Five hundred and sixteen manufacturing plants are located in the city, many of them doing a nation-wide business and some international in extent. There are approximately 44,564 gas meters connected to 535.34 miles of main within the city.




N. G. E.

MULTIPLE UNIT VENTURI TYPE GAS BURNERS

Series 100



N.G.E. Series 100 Gas Burner with draft control regulator,—providing automatic and accurate control of both air and gas.

As illustrated above, Series 100 N. G. E. Burners are primarily designed for installation in large gas-fired steam boilers, stills, etc.

In one compact unit, N. G. E. engineers have combined the advantages of both the multiple jet type burner and the venturi type burner—obtaining the high combustion efficiencies at low operating pressures of the former and the high ratings with minimum draft and limited combustion space of the latter.

Outstanding operating economies have been achieved with the installation of Series 100 Burners, especially in cases of plant modernization when serviceable yet extremely wasteful equipment was replaced with these N. G. E. Burners.

A new Bulletin has just been prepared, completely describing the engineering and operating details of N. G. E. multiple unit venturi type burners. Write for your copy.

NATURAL GAS EQUIPMENT INC.

1123 Harrison St. San Francisco

Petroleum Securities Bldg. Los Angeles

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

## Employees Aid Dallas Gas Co. Summer Range Sales

Sales effort on the part of general employees of the Dallas Gas Co. during the recent spring range campaign resulted in the sale of 201 units out of a total of more than 400 sold during the project, according to C. K. Patton, new business manager for the company. The employees were divided into five groups, each vying with the others in a competitive drive for the individual, team, and group prizes offered during the project.

Employee cooperation is again being enlisted by Mr. Patton in a second range sales campaign, the "Centennial Sale to End Hot Kitchens," being staged in conjunction with the Texas Centennial now in full swing at Dallas. With a slogan that "the first 100 years are the hottest," the Centennial campaign stresses cooler kitchens for the summer months by featuring modern, insulated, automatically controlled gas ranges.

■ ■

## Bird Named Western Public Service Co. President

WM. BIRD, since 1932 manager of the Bellingham district of Puget Sound Power & Light Co. with headquarters at Bellingham, was recently named president of the Western Public Service Co. of Scotts Bluff, Neb.

Mr. Bird first became affiliated with Stone & Webster organizations in 1910, starting in the transportation office of the Jacksonville Electric Co., Jacksonville, Fla. During the past 26 years he has served the organization in such widely scattered points on the map as Houston and Galveston, Texas; Boston, Mass.; Tampa, Fla.; Savannah, Ga.; Fort Madison and Keokuk, Iowa; Paducah, Ky.; Sidney, Nova Scotia; and Seattle and Bellingham, Wn.

■ ■

## T. J. Strickler Elected A. G. A. Director

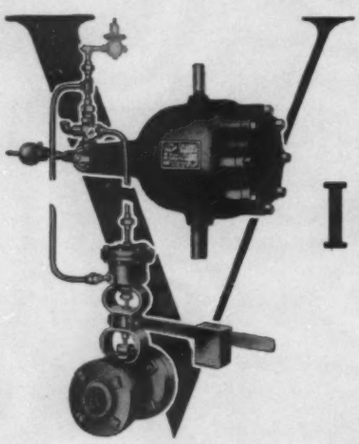
The Executive Board of the A.G.A. has elected T. J. Strickler, vice-president and general manager of the Kansas City Gas Co., Kansas City, Mo., a director to fill the unexpired term of the late Judge H. O. Caster. Mr. Strickler's term will expire in November, 1937.

Mr. Strickler at present is chairman of the Committee to Conduct National Advertising, and has been active for years in the American Gas Association. In 1932 he was chairman of the Natural Gas Department.

■ ■

## Barber Gas Burner Company Leases Detroit Office

The Barber Gas Burner Co. of Michigan has established a sales office, assembling and service plant and warehouse at 4475 Cass Avenue, Detroit, Mich., taking a long term lease. While the company is a subsidiary of the Barber Gas Burner Co. of Cleveland, Ohio, it has applied for a charter under Michigan corporation laws. The State of Michigan and Western Ontario, Canada will be the fields of its business activities.

QUIET
VIGILANT
SURE

CF

VIGILANT
Liquid Level Regulator
with
V-Port Valve

Chaplin-Fulton pressure-control equipment has been in successful use for fifty years. Write for complete catalog.

Fluctuating demands, under light loads or heavy, cause no inconvenience where the Vigilant Liquid Level Regulator with V-Port Valve is employed. When the regulator is wide open, it has a capacity equal to that of the pipe. When flow is down to a minimum, the valve throttles automatically to keep the liquid at the level desired, without variation.

THE CHAPLIN-FULTON MFG. COMPANY
28-40 Penn Avenue Pittsburgh, Pa.


## MODERN METHODS AND MATERIALS

A letter to GAS will bring you any of the selected reference bulletins listed below, without cost. Indicate by number which you desire.

**NO. 130—COMPRESSOR REGULATOR**
Folder describing a compressor or back pressure regulator illustrated with cut-away drawings showing construction and operation. Contains sizing table based on discharge pressures.

**NO. 131—GAS MIXING APPARATUS**
Ten-page mimeographed bulletin covering gas making or mixing apparatus and butane-air gas plants. Details operation of the process through its several stages and covers installation, B.t.u. control, etc., and gives instructions for submitting data for quotation.

**NO. 132—AIR-COOLED MUFFLERS**
Pamphlet in color dealing with air-cooled mufflers contains drawings of typical installations with both overhead and bottom type exhaust engines. Photographs illustrate typical installations, and a table lists dimensions of mufflers for various types of engines.

**NO. 133—AIR CONDITIONING**
Leaflet in color gives data on a central gas-fired, automatic air conditioning unit for installation on existing hot water heating systems. Cross section illustrations show the operating parts and installation layout.

**NO. 134—INDUSTRIAL COMPRESSORS**
Catalogue on a line of single- and two-stage industrial compressors and vacuum pumps from ¼ to 15 h.p. with capacities from 1.2 to 102 cu. ft. per minute producing pressures up to 1,000 pounds and vacuums to within .35 inch of mercury.

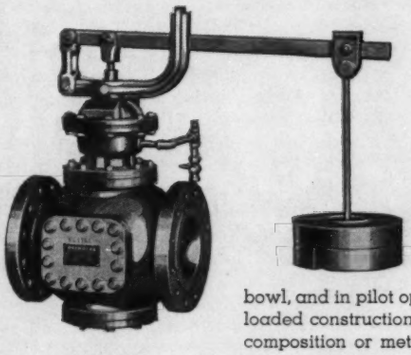
**NO. 135—CONSUMER SURVEY**
Statistical findings of a consumer survey conducted for and published by a manufacturer of heating controls. Twelve-page booklet contains such information in table form as percentages of owners and renters in certain localities, burner purchases made since fall of 1935, influencing factors in the sale of heating controls, percentage of heating equipment turned down at night, replacement and modernization market figures, etc.

**NO. 136—CONTROLS**
Bulletin on a line of controls for time-temperature, flow, liquid level, pressure, time-pressure and humidity regulation.

**NO. 137—COMBUSTION METERS**
Profusely illustrated catalogue covering a line of combustion meters describing the instruments and giving engineering data on their application.

**NO. 138—NAILS AND WIRE**
Forty-page catalogue on an extensive line of wire nails, wire, and steel fence posts. Each type of nail is illustrated and price list gives lengths of nails, gauge number and diameter of head.

# WIDER RANGE



Reynolds High Pressure Line Regulator . . . without auxiliary bowl. . . . Available with bowl, and in pilot operated or pilot loaded construction with choice of composition or metal seats.

★ **REYNOLDS New High Pressure Line Regulator without auxiliary bowl, features a wider range of delivery control pressure.**

**For outlet pressure, from 2 to 100 pounds in the line, this unit assures absolute accuracy . . . dependable control. Variance in outlet pressure is made possible by use of four different sizes of diaphragm cases.**

**On inlet pressure, range is up to 650 lbs. Regulator furnished in cast iron, steel or bronze body, depending upon pressure requirements.**

**Write for details.**

## REYNOLDS PRODUCTS

**High Pressure Service House Regulators** — Straight Lever Type — Models 0-10-20 series; Toggle Lever Type—Model 30 series.

**Low Pressure Service or Appliance Regulators.**

**District Station Regulators, Single or Double Valve**—Auxiliary Bowl and Automatic Loading Device Optional.

**High Pressure Line Regulators**—Pilot Loaded—Pilot Controlled.

**Toggle Type Regulators**—Single Valve, Double Valve, Triple Outlet.

**Seals**—Dead Weight or Mercury. Back Pressure Valves . Automatic Quick Closing Anti-Vacuum Valves . Automatic Shut Off Valves . Lever Operated Valves . Louver Operated Device . Atmospheric Regulators . Vacuum Regulators.

★

**Branch Offices:**

421 Dwight Building
Kansas City, Mo.

2nd Unit,
Santa Fe Bldg.
Dallas, Texas

**Representatives:**

Eastern Appliance Co.
Boston, Mass.

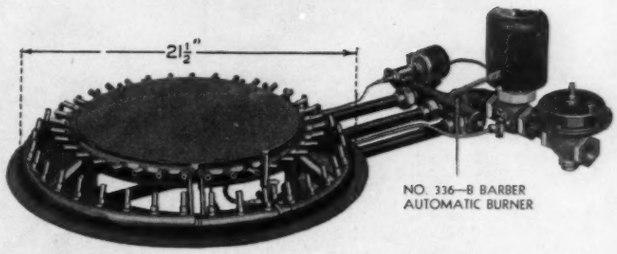
F. E. Newberry,
Avon, N. J.

★

**REYNOLDS GAS REGULATOR CO.**
**ANDERSON, INDIANA, U. S. A.**

GAS CONTROL SINCE 1892

# Why BARBER
## *is the Outstanding Conversion*
# BURNER




NO. 336—B BARBER AUTOMATIC BURNER

**FOR 18 years Barber Burners have set the standard, the country over, for Conversion Burner reliability. Why is this a fact? Because Barber Automatic Burners mean, from the User's standpoint, *sensible* fuel bills and *trouble*-free service, year in and year out. To the Heating Trade, they mean *easier installation* and *minimum servicing*. To Gas Companies they stand for *satisfied customers*, fewer removals,—and therefore a PREFERRED BURNER on time payment sales.**

- Eight different sizes to accommodate round grate diameters from 12" to 34". Also "tailor-made" to SUIT and FIT the grate dimensions of oblong furnaces or boilers.
- Insure a "scrubbing" flame action on side walls of firebox, at the proper level, with 1900° Fahrenheit flame temperature.
- No fire brick or refractory elements needed — Barber Burners require only 70% of the installation time of Burners using such elements.
- Equipped with the improved Barber noiseless jets, unequaled for air-mixing efficiency.
- Furnished with Klixon or Baltimore Safety Pilot Control—positive and accurate.
- Listed in the A. G. A. Directory of Approved Appliances.

We supply Sales Literature, Specification Data Sheets and Practical Sales Assistance. Write at once for latest Illustrated Catalog No. 37 and Revised Price List.

**THE BARBER BURNER CO.**
**3704 Superior Ave. Cleveland, Ohio**

**THE BARBER GAS BURNER COMPANY OF MICHIGAN**
**4475 Cass Ave., Detroit, Mich.**

**BARBER** *Automatic* **JET GAS BURNERS**

● **for Warm Air Furnaces, Steam and Hot Water Boilers and Numerous Other Heating Appliances** ●

NEW LOAD

WITH

GLO-FIRE

"THE ODORLESS GAS LOG"

Gas companies, everywhere, acclaim the GLO-FIRE Log as a solution to their fireplace load problem . . . because it is actually

- ODORLESS
- ECONOMICAL
- REALISTIC
- AGA APPROVED

NATIONAL DISTRIBUTORS

Colonial Shops

*Glo-Fire sales division*

3350 WEST FIRST STREET
LOS ANGELES, CALIF.

REDUCE
Operating Cost
— WITH —
SPRAGUE METERS
— AND —
SPRAGUE REGULATORS

SPRAGUE METER COMPANY
Bridgeport, Conn.
Los Angeles-San Francisco, Cal.

MUELLER GAS DISTRIBUTION EQUIPMENT

The time-tested Mueller line includes Mueller Evenflow Service Regulators, Gas Stops, Service Stops, Stove Stops, Drilling and Tapping Machines, service boxes, meter trims and similar equipment. Write for description and prices.

MUELLER CO., Los Angeles, Calif.

Factories: Decatur, Ill.; Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ont.
Branches: New York and San Francisco

PORCELAIN ENAMEL INSTITUTE, INC.
612 NORTH MICHIGAN AVENUE • CHICAGO

Please send me, absolutely free, a copy of your new, easy-reading, profusely illustrated sales manual on Porcelain Enamel.

Name_____

Firm_____

Address_____

## Lansing, Michigan, on Natural Gas Service

*(Continued from Page 13)*

Of most interest in connection with the 62-mile Lansing line is the fact that construction commenced in the dead of winter—and pipe-liners exclaim "What a winter."

From an employee of the company who traveled the line during winter's siege, comes the following:

"Mountainous drifts blocked the roads and blizzard-clouds of snow swept across the barren fields. The gulleys and drainage canals became leveled bowls of snow and ice. Time and time again the powerful pipe trucks plunged into drifts and their motors groaned and stalled.

"The clearing crew became a snow removal crew, and sub-zero days found them battling high winds, ice-covered underbrush, shoveling snow and hacking away blockades of ice that the pipe line might go through."

With moderating weather and thawing ice and snow, water and mud added further problems. Trenches filled with water until it was necessary to sink the pipe with tractors and anchor it at the bottom with concrete blocks.

Between the time natural gas reached Lansing and suburban area and June 13 a total of 778 space heating jobs had been sold in the market. Total consumption from these jobs will approximate 194,000,000 cu. ft. per year. Numerous other sales not included in the above, have been made for installation in the fall.

The sales campaign began actively on May 1 following a two-weeks training course held for the 21 salesmen attached to the district. Ninety-six jobs were sold in the training period. A tentative quota of 1600 space heating jobs has been set for 1936.

In carrying out its sales program, Lansing and suburban territory is divided into five districts. The four districts outside of Lansing embrace approximately 1400 meters each. Total meters in the territory as of the end of 1935 was 25,808.

The rate effective for househeating is:

.75 cents per month, net, first 300 cu. ft. or less.
$1.00 net per 1,000 ft. for next 1200 cu. ft. per month.
.75 cents net for next 3500 cu. ft. per month.
.50 cents net per 1000 cu. ft. for all over 5,000 cu. ft. per month.

The bulk of the house heating gas falls in the 50-cent step. The average rate for that portion of gas used for house heating is approximately .53 cents per 1,000 cu. ft.

Due to the location of automobile plants and allied industries in Lansing, the prospect for obtaining considerable industrial business is excellent.

While Consumers Power only dates back to 1931 in natural gas history, the physical foundation of the company's electric department dates to 1886. Even now the company is celebrating its 50th anniversary of electric service.

Consumers Power Co. of Maine was organized in 1910, with the present state-wide or-

ganization dating back to 1915. Wendell L. Willkie of New York, president of Commonwealth & Southern Corp., is chairman of the board of Consumers Power Co. T. A. Kenney of New York is president. Dan E. Karn is vice-president and general manager, having headquarters at the general offices of the company at Jackson. M. W. Arthur is vice-president and assistant general manager and John D. Williams is general superintendent of the gas department.

■ ■

## Homemaker's Institute At Lubbock, Texas

*(Continued from Page 20)*

tion and the home economics students vied with one another for the privilege of assisting in the back-of-stage kitchen.

Mrs. Blinks collaborated in planning the programs and had written out all of her lectures, so mimeographed copies were available for the women at the close of the sessions. It was amazing how eagerly the women took these copies home to study.

Interesting attendance prizes were offered each day and grand prizes at the end of Institute.

The daily programs contained registration blanks, listed the prize features, devoted one entire page to menus and household hints, and also contained a "question box" to bring out subjects for informal discussion.

Each session was broadcast and spot announcements were given during the morning, so it was well publicized. It took the women two days to realize the significance of what was being attempted and then the Institute ended in a wave of enthusiasm. The whole Institute was a short course in homemaking so successful in its attendance and the genuine interest shown that it is being considered as a semi-annual feature, marking the dawn of a new era of home service rendered by a utility to its public.

Attendance reached a peak of over 1,000 housewives on the last day—something of a record considering Lubbock's total of 4400 gas meters.

■ ■

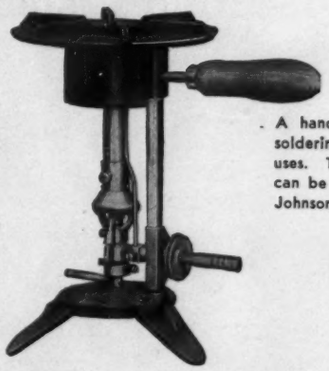
## McCalls Model Homes

McCalls Magazine is sponsoring the construction of a number of model homes throughout the country, each one conforming to the architecture of the respective region. One of these homes in Los Angeles near 63rd Street and West Boulevard was to be completed early this month. It is on the lines of the Los Angeles Gas and Electric Corp., and will be equipped with gas range and water heater and two floor furnaces. The home will be open for inspection for two or three months.

■ ■

## New No. Natural Offices

Northern Natural Gas Co., headquartering at Omaha, Neb., recently transferred its main office from the City National Bank building to the Aquila Court building, leasing 12 thousand square feet of office space on the third floor for a 5-year period. The headquarters office employs 125 persons.

JOHNSON NO. 2 ADJUSTABLE BUNSEN TORCH

A handy, efficient, economical torch designed for metal melting, soldering, tempering and many other shop, laboratory and general uses. Top is removable and burner is adjustable to any angle or can be detached for use as an efficient hand torch. Another famous Johnson product. Free catalog on request.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Western Representative: C. B. BABCOCK CO. 135 Bluxome Street San Francisco, Calif.

Eastern Representative: J. H. McPHERSON 250 Stuart Street Boston, Mass.

YOU *can save* TIME *and* MONEY *with the* GREENLEE *Hydraulic Pipe Pusher*

The Greenlee Hydraulic Pipe Pusher is self-contained. It operates on a notched steel base, so that it is necessary to reset the pipe clamp only every 4 to 7 feet, depending on the length of base used. By taking advantage of hydraulic pressure, this tool has been made very compact and easy to operate. One man, standing in a comfortable position, can exert the maximum pressure of 40,000 pounds on the pipe clamp. Capacity is provided for pipe from 1¼ to 4-inch.

It doesn't make much difference how the underground installation of pipe has been made, in order for the Greenlee Hydraulic Pusher to show real savings. It does away with much trenching, backfilling, tamping, etc.; it saves tearing up lawns and pavement; and it shows a time and labor saving over the pushers that require several men to operate them when difficult soil is encountered. All that is necessary with the Greenlee is to make a trench long enough to accommodate the pusher with a section of pipe, and one man can furnish sufficient power to send it where it is wanted, simply by pumping the levers. It is easily set up, and there are eight speeds provided for varying soil conditions.

GREENLEE TOOL CO.
1700 Columbia Ave.
ROCKFORD, ILLINOIS

*LET US SEND COMPLETE DETAILS*

GREENLEE TOOL CO., 1700 Columbia Ave., Rockford, Ill.
Please send complete details on the Greenlee Hydraulic Pipe Pusher.

Company .....

Address .....

City..... State.....

By.....WG7-36

# "Sav-T-Heat" Gas-Vapor Heating System

THE C. A. Dunham Co., 450 East Ohio Street, Chicago, Ill., has announced a revolutionary method of heating, whereby a mixture of gas combustion products and water vapor is circulated through piping and radiation by a suction fan, and the cooled non-condensible gases finally exhausted to the atmosphere at a convenient point remote from the generator or furnace.

An interior view of the Sav-T-heat generator is shown in Fig. 1. The products of combustion are passed directly into a mixing chamber where the hot gases take up water vapor. This gas-vapor mixture is then conveyed through the piping system to the radiators, where the moisture is condensed and the gases are cooled by the transfer of heat to the surrounding air. The condensate and the cooled gases then pass into the return piping, the condensate being returned to the water jacket of the generator and the gases discharged through a flue.

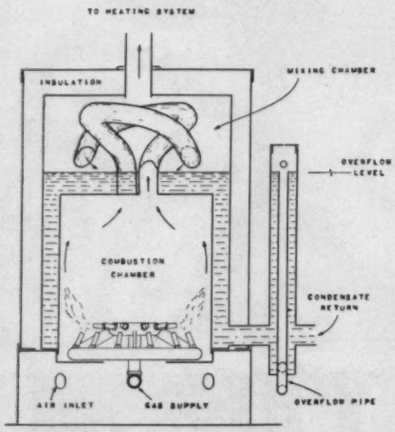



FIG. 1. Interior of "Sav-T-Heat" generator.

The generator is made of a non-rust copper alloy, the fittings of brass, and all piping of copper, so that in spite of deliberate condensation and even with the usage of relatively high sulphur gas, corrosion is negligible and comparable to that encountered in conventional iron pipe heating systems.

The unit is small and compact because of controlled air supply which enables a large amount of gas to be burned in a small space, and because of elimination of large heat absorbing surfaces. It is designed to heat the average five- or seven-room house, each generator having a maximum heat input of 100,000 B.t.u. per hour. Inasmuch as all the water vapor of combustion is condensed, so as to develop the gross B.t.u. of the gas, and the flue discharge is completely cooled, the manufacturers state that high efficiencies are obtainable.

When more than one-unit heating capacity is required, it is recommended that two or more units be installed and operated independently. Full automatic control is provided, with "on" and "off" room thermostats, and quick heating is obtained because of rapid circulation.

■ ■

## Now It's Canned Frog Backs Cooked by Natural Gas

CANNED frog, prepared in a steel pressure cooker operated on natural gas supplied by the United Gas System, is the Creole delicacy offered to a public with gastronomical discernment by the Louisiana Frog Co., Rayne, La. Having supplied a wide market with frog legs for many years, the company has just recently branched into this new phase of the industry, canning the backs and other meaty parts of the frog that had hitherto been regarded as useless. It is expected that other frog canning companies will make use of natural gas in installing similar operations.

■ ■

## Stephens Made Auditor

Noble H. Stephens, formerly assistant supervisor of general bookkeeping for the Portland Gas & Coke Co., Portland, Ore., has been transferred to the treasurer's office to become auditor of Portland Gas & Coke Co. and Northwest Electric Co., according to an announcement by C. W. Platt, secretary-treasurer.

Lewis Duncan was advanced to the position of assistant supervisor of general bookkeeping, according to George Mackenzie, chief accountant.

■ ■

## United Promotes Jackson

Dean A. Strickland, distribution sales manager of the United Gas System, Houston, Texas, announces the June appointment of J. O. Jackson as residential sales director replacing the late Jack S. Arnold. R. S. Collings succeeds Mr. Jackson as general sales assistant.

■ ■

## A. P. I. Department Moved

Headquarters for the Department of Accident Prevention of the American Petroleum Institute were recently transferred from Dallas, Texas, to New York. Offices in Room 1832, R. C. A. Building, 50 W. 50th Street, New York, have been opened by the department's director, H. N. Blakeslee.

■ ■

## Texas Distributing Co. Sold

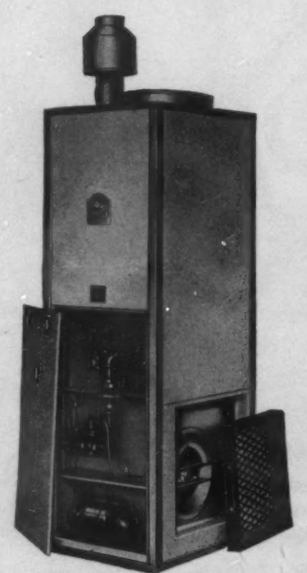
Late in May Lea County Gas Co. purchased El Paso Gas Utilities Co., a distributing subsidiary of El Paso Natural Gas Co. The sale of the company, which serves gas at the city limits of El Paso, takes the El Paso Natural Gas Co. out of the distributing field.

■ ■

## Large Gas Well Brought In

The largest producing well in the Tri-Township Gas Fields in Michigan was brought in June 16 by the Wolverine Natural Gas Co. with an officially rated open flow of 77,248,000 cu. ft. per day. The well is known as the L. E. & Elsie Richardson No. 1.

NOW ... *Any Size Building*
*Can Have Modern Forced Air Heat!*



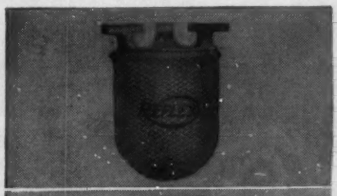
Quiet, compact, efficient heating and ventilating unit supplies filtered air—**warm in winter! Cool in summer!**

PACIFIC
*Forced Air Unit*
MODEL A-11

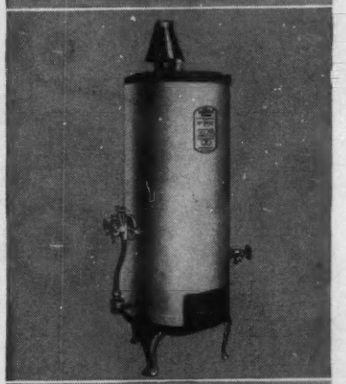
Easily installed in kitchen, closet or screened porch. NO BASEMENT REQUIRED. Automatic controls maintain constant, uniform temperature, guard against overheating, save fuel.

*Write for catalog WG-7*
PACIFIC GAS RADIATOR CO.
Huntington Park, Calif., U.S.A.

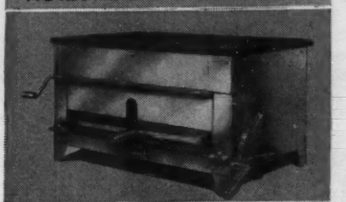
*Pacific*
GAS HEATING HEADQUARTERS



GAS MANTLE



HOTZONE GAS WATER HEATER



HOTZONE BROILER-GRIDDLE

# MORE NEW HOMES AND APARTMENTS ARE NOW BEING BUILT THAN FOR MANY YEARS

—this offers you a big market for gas and for

## HOTZONE GAS WATER HEATERS

Sell complete gas service to these new homes and apartments—with appliances that will help you achieve a new sales quota *and also* help you keep your market sold for years to come.

The Welsbach HOTZONE Gas Water Heater performs this dual sales-service. It's low operating cost and smooth and dependable efficiency make it easy to sell now and guarantee years of consumer satisfaction.

## Welsbach Company

*Gloucester City, N. J.*

BRANCHES IN CHICAGO AND SAN FRANCISCO

*Since 1887 Pioneers in the Manufacture of Gas Burning Appliances*

# *Don't let this be your fault*

CLEAN gas from Blaw-Knox Gas Cleaners materially reduces service complaints. Concentrate your cleaning costs at one point and use the cleaner which thoroughly cleans at the lowest cost. Blaw-Knox Gas Cleaners at City Gate, Town Border or large District Regulator Station will do this.

*The Washing Oil Cost is Very Low!!!*

One company found .00174 cents per M removed nearly three tons of dust. Another found .0171 cents per M and removed many tons of dust.

**Pilot lights are sensitive—Insure their better operation and thus insure better public relations with**

## BLAW-KNOX GAS CLEANERS

*Complete details on request without obligation—just write*

BLAW-KNOX COMPANY

2033 Farmers Bank Building Pittsburgh, Pa.

# Air Conditioning With a Ford V-8

*(Continued from Page 12)*

cost of the electrical energy required at the very favorable electrical rate of 2 cents per KWH.

The gas rate under which the unit is operating is as follows:

| | | | |
|---|---|---|---|
| First | 30 M | c.f. | 27c per M |
| Next | 170 M | c.f. | 18c per M |
| Next | 2,000 M | c.f. | 14.4c per M |
| Next | 5,000 M | c.f. | 12.8c per M |

The 20-ton compressor is now operating under about a 7-ton load and is using 140 cubic feet of gas per hour. This means that about 20 cubic feet of gas is required to develop 1 ton of refrigeration, which is logical because of the poor load factor. The company is now putting on additional load to bring it up close to 20 tons at which time the cubic feet of gas per ton is expected to drop to between 14 and 16, making the consumption per hour between 280 and 320 cubic feet, which at the initial steps of the rate would cost a little less than 9 cents per hour.

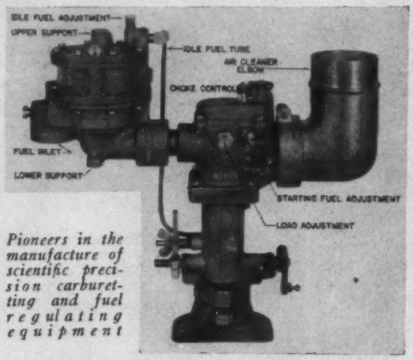

# *Adapted to handling* VARIABLE LOADS— *Efficiently Economically*

This easy starting Ensign Gas Carburetor and Fuel Regulator assembly is particularly adapted to installations where operating requirements demand maximum control in the handling of variable loads, such as in air conditioning and similar type plants.

The Ensign installation in the air conditioning plant of the Amarillo Gas Company of Amarillo, Texas, offers a good example of its widespread use and successful application where variable load conditions demand the utmost in carburetting flexibility. Here a Ford V-8 power unit is utilized, being equipped with an Ensign Gas Carburetor and Fuel Regulator of the type illustrated. The remarkable results in efficiency and economy being achieved further attest to Ensign's adaptability to this class of service of which air conditioning represents a relatively new and important field.

Easy starting, smooth operation, accurate control and minimum fuel consumption through the proper metering of fuel are the highlights of Ensign performance. Adapted practically to all types of multiple cylinder stationary engines.

***Ensign "Easy Starting" Gas Carburetor & Fuel Regulator for Ford V-8 Power Unit***




*Pioneers in the manufacture of scientific precision carburetting and fuel regulating equipment*

★ ★ ★

**Write for Bulletin No. 95-A giving more detailed information relative to the Ensign Gas Carburetor and Fuel Regulator for this class of service; shows fuel consumption, torque, b.h.p. developed, and other important performance characteristics.**

## Ensign Carburetor Company, Ltd.

7010 South Alameda St. (P. O. Box 606) Huntington Park, California

Mid-Continent Distribution and Service Facilities Maintained by: A. E. Schuller, Inc., 114-116 E. 9th St., Tulsa, Okla. The Binkley Co., Oklahoma City, Okla. Portable Rig Co., Houston, Dallas and Longview, Texas.


Having demonstrated to its own satisfaction that air-conditioning by natural gas engine power is thoroughly practical the company is now actively promoting interest in this application. Current advertising and publicity features the gas company air-conditioning installation, inviting patrons to come in and inspect its operation and get information on the costs involved.

■ ■

## Denver Co. Scales Peak In Sales Drive

TAKING its theme from the surrounding mountainous environment the May sales campaign of the Public Service Co., Denver, Colo., featured a "Climbing Mt. Evergas" contest, formulated by R. G. Munroe, gas new business manager. The May quota and the summit of Mt. Evergas were set at $29,-141 ft. At the close of the contest on May 31st sales were sitting in a captive balloon $37,472 ft. above sea level and $8,331 ft. above the $29,141 ft. goal.

In June the mountain climbing contest was supplemented by a "Balloon Race and Stratosphere Flight." All salesmen who had completed their May quotas were given balloons, and on June 1st were cut loose from the top of Mt. Evergas in an effort to soar $40,000 ft. higher to attain a prospective May and June sales total of $72,395 ft.

■ ■

## Shell Co. Brings In San Joaquin Valley Gaser

Indications of a new natural gas area are seen in Shell Oil Co.'s Stephens No. 1 wildcat brought in on a 5,000-acre block of Kern County land with several hundred barrels of 63-deg. gravity crude and 18,000,000 cu. ft. of gas. The well marks the first production on the floor of the San Joaquin valley in many years. It was drilled to 7888 feet, and casing was set at 7800 feet. Rock and gravity pressure are high.

The Stephens area is 8 miles east of the Elk Hills Field and 12 miles southwest of Bakersfield. Before the end of the year it is expected that Shell Oil Co. will install an absorbtion plant, and that the 12,000,000 cu. ft. of gas now daily escaping will be processed for domestic use.

■ ■

## Service Pins Awarded

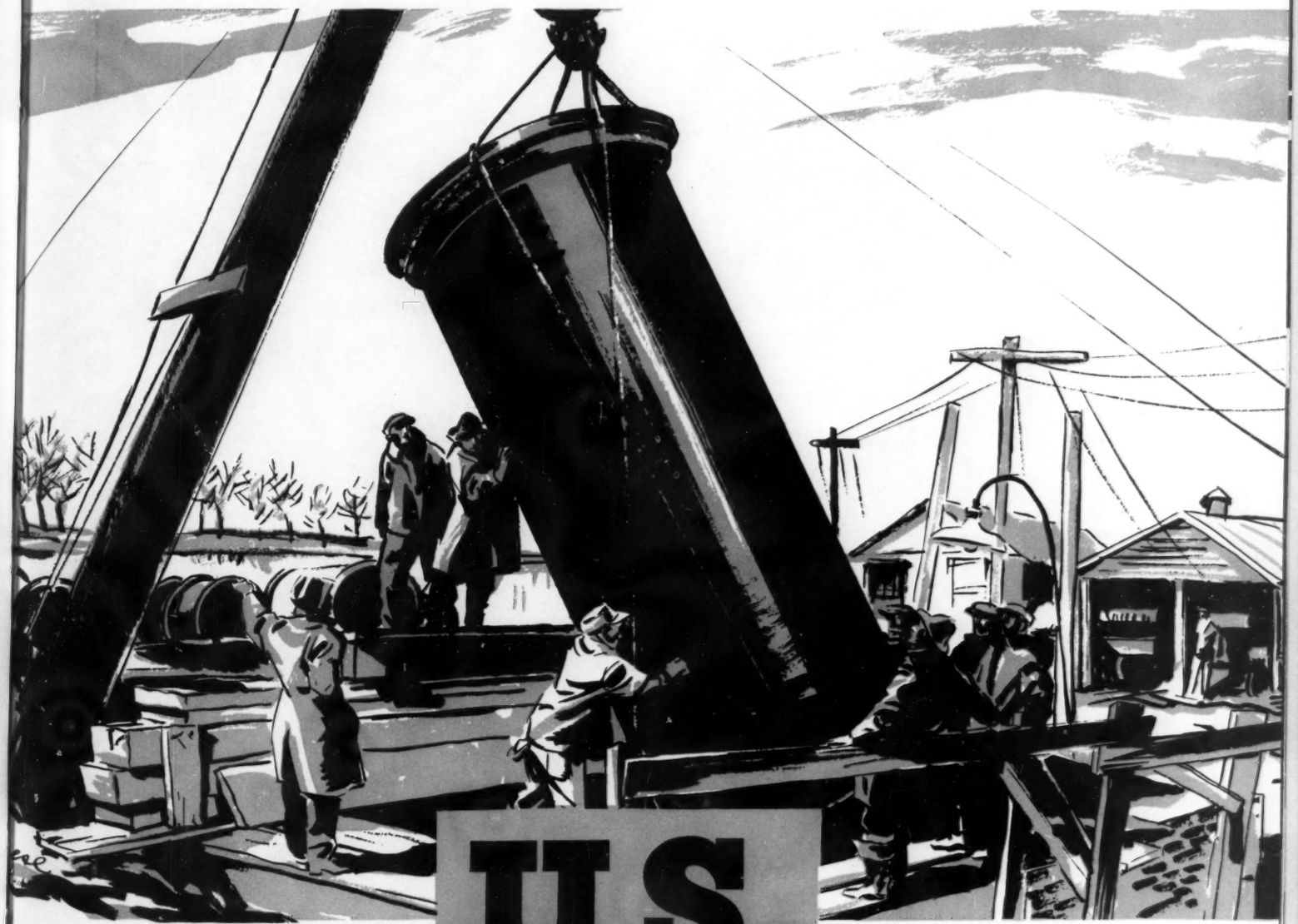
Consumers Power Co. of Jackson, Mich., inaugurated on June 17 a program of awarding service pins to employees in recognition of their loyalty and devotion to the company's ideals of public service. Pins will be awarded to employees who have completed five, ten, fifteen, twenty and twenty-five years of continuous employment with the company. A total of 3,205 out of 5,522 employees on the payroll will be eligible to receive the pins.

■ ■

## Co. Builds 5 Model Kitchens

Five model kitchens are being constructed by the Southern California Gas Co. for display in the larger offices throughout the company's system. The kitchens will contain the most modern kitchen equipment, and each will display a clock-controlled gas range and an Electrolux gas refrigerator.

• SEVENTY years before our Company was organized a cast iron water main was laid in the Greenwich Village section of New York City. This 105-year old main is still in service and in excellent condition. We have 35 years experience in perfecting and producing cast iron pipe; one of the finest foundry laboratories extant; and exceptional facilities for pipe manufacture and service. But the most important thing we have to offer is the native high resistance to corrosion of good gray iron.



*Super-de Lavaud Centrifugal Cast Iron Pipe*
*U. S. Pit Cast Pipe*
*U. S. Mechanical Joint Pipe*
*U. S. Ni-Resist Cast Iron Pipe*

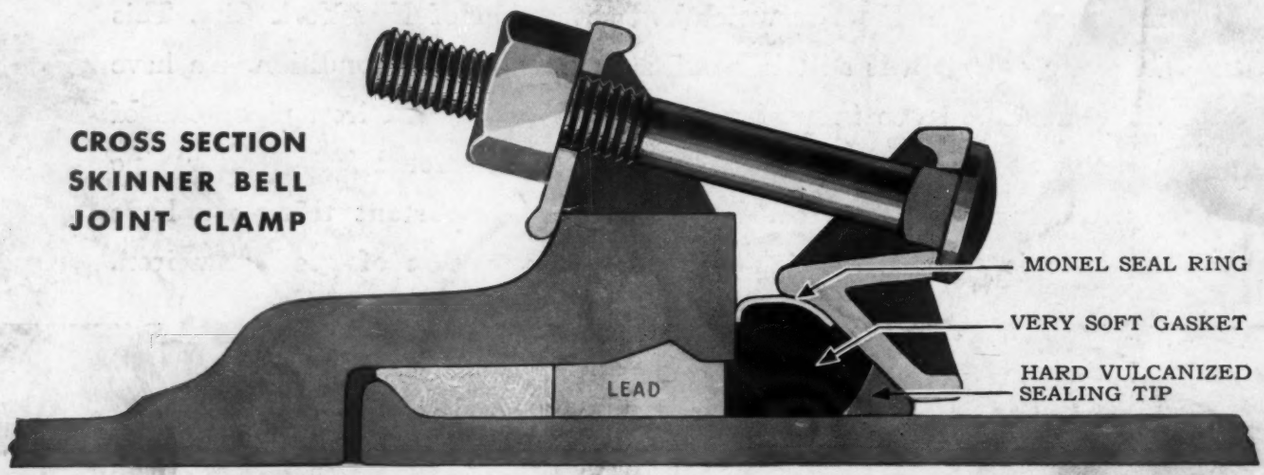
# U.S. cast iron PIPE

*U. S. Threaded Cast Iron Pipe*
*U. S. Flexible Joint Pipe*
*Alloy and Gray Iron Castings*
*U. S. Cast Iron Culverts*
*U. S. Cast Iron Roof Plates*

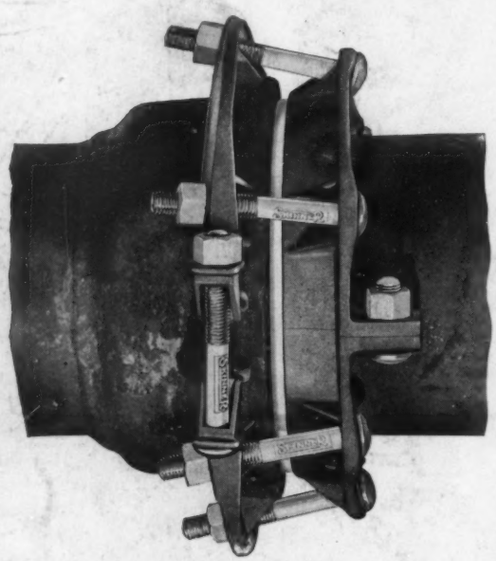
**Cast iron and alloy cast iron pipe centrifugally or pit cast—for water works, gas, sewerage and drainage service as well as industrial uses involving corrosives.**

U. S. PIPE & FOUNDRY CO.
BURLINGTON, NEW JERSEY
Foundries and Sales Offices throughout the U. S.

**CROSS SECTION SKINNER BELL JOINT CLAMP**




# HOW SKINNER *Seals* GASKETS



**SKINNER BELL JOINT CLAMP**

Complete adjustability for variations in pipe diameter reduces the number of clamps you have to carry on hand. Speedy application and absolute permanence mean worthwhile maintenance savings.

**SKINNER BELL JOINT CLAMPS** are typical of the exclusive, patented Skinner method of sealing gaskets under pressure . . . for absolutely permanent repair. Cross section above shows soft rubber gasket **FULLY SEALED** . . . at the bell face by Monel metal band; at pipe by hard vulcanized tip . . . sealing in pressure; sealing out air, moisture, and gasket-destroying soil conditions!

Be sure to get this extra protection when you buy bell joint clamps. Remember, Skinner clamps are the only clamps with **SEALED GASKETS** . . . and don't forget Skinner's "instantaneous" shipping service.

GET COMPLETE CATALOG

M. B. Skinner Company, South Bend, Ind.
Please send latest catalog of Skinner leak clamps and saddles.

NAME G

ADDRESS

## M. B. SKINNER CO. *Est. 1898* SOUTH BEND, IND.